

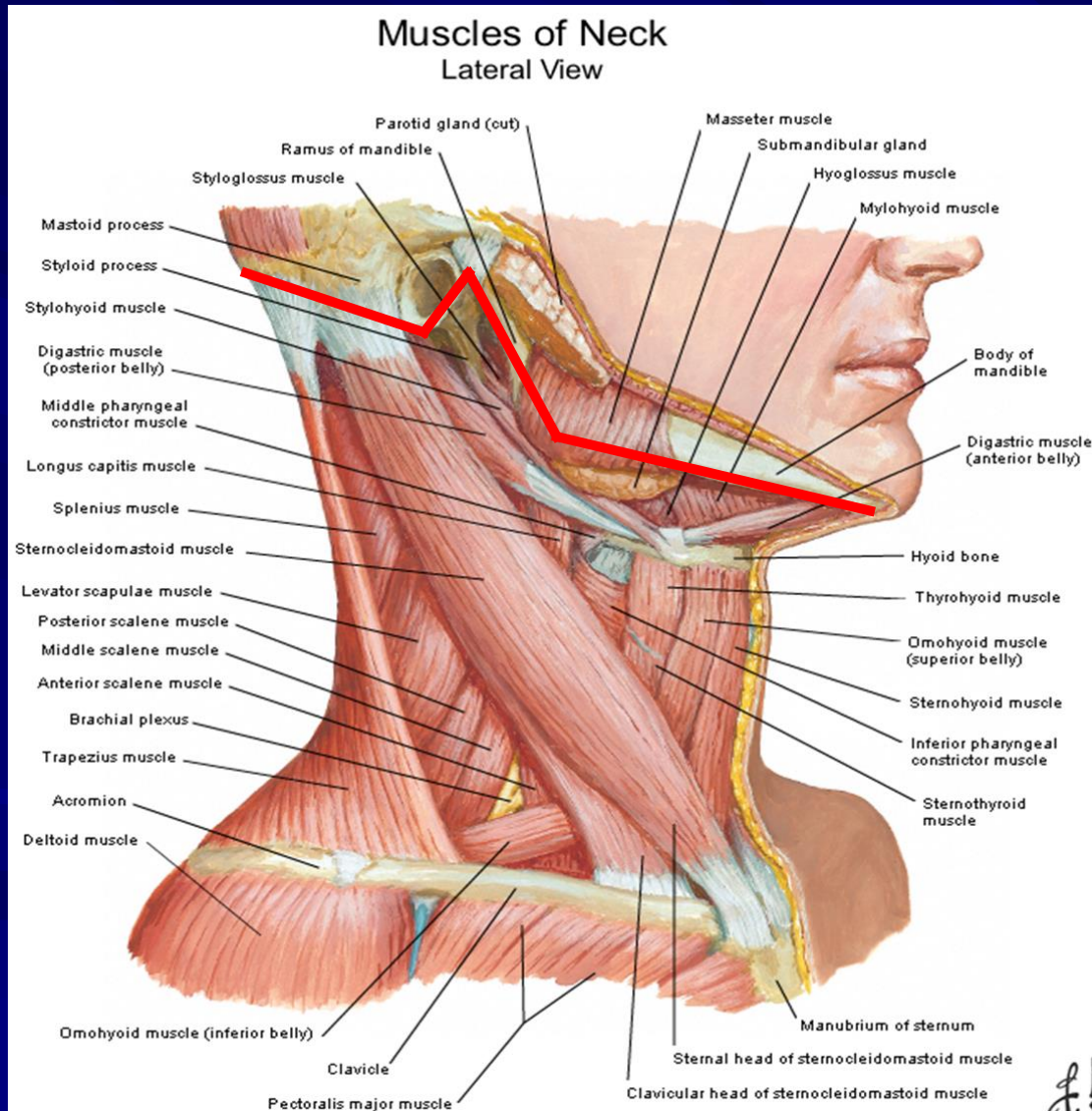
Lecture # 2

**CLINICAL ANATOMY OF THE NECK.
OPERATIVE SURGERY OF REGIONS AND
ORGANS OF THE NECK**

Plan of Lecture

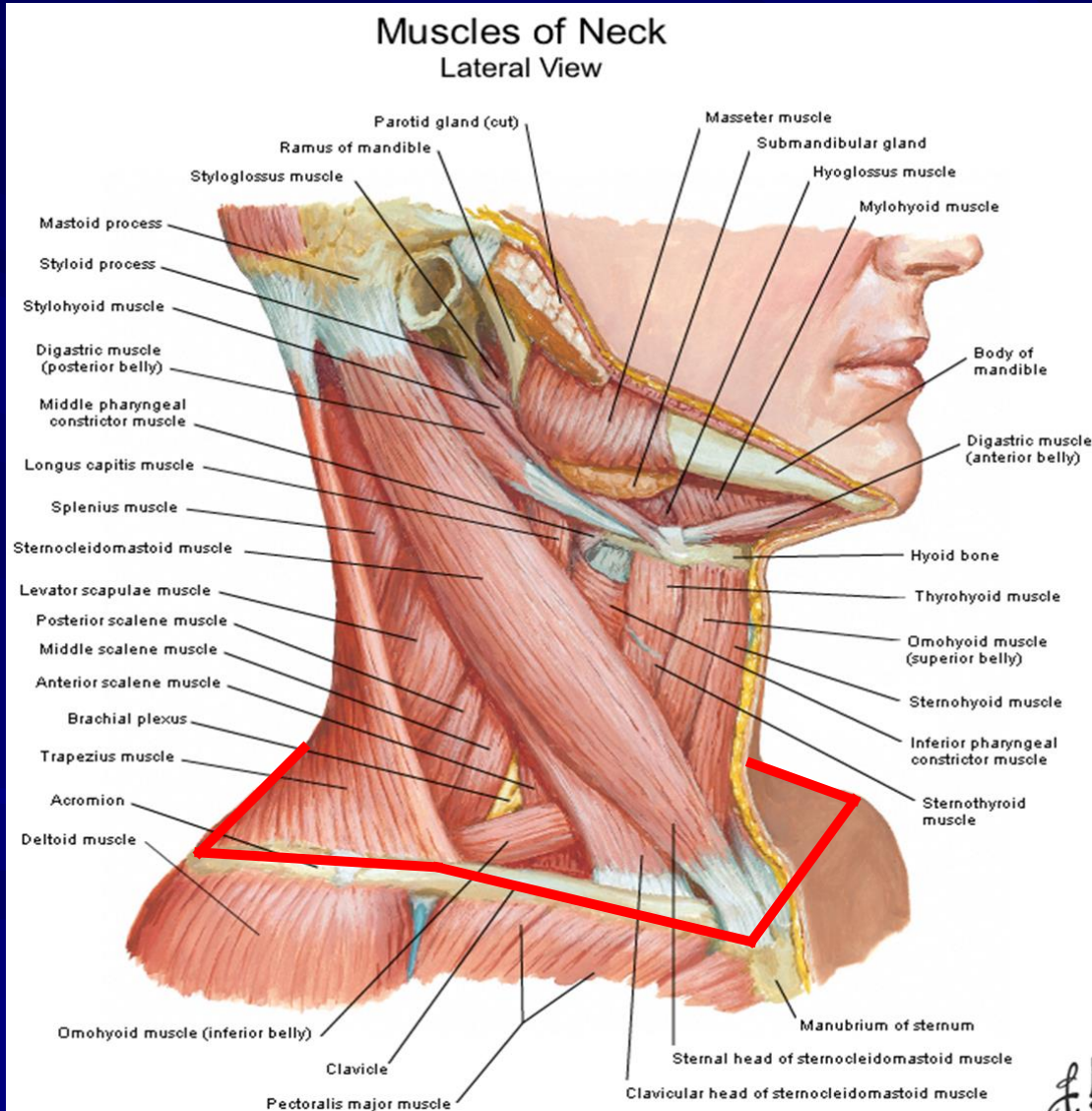
1. Neck: Regions and triangles
2. Fasciae, interfascial cellulos spaces of the Neck
3. Vessels, nerves and lymphatic system of the Neck
4. Operative surgery of the Neck

Superior border of the Neck



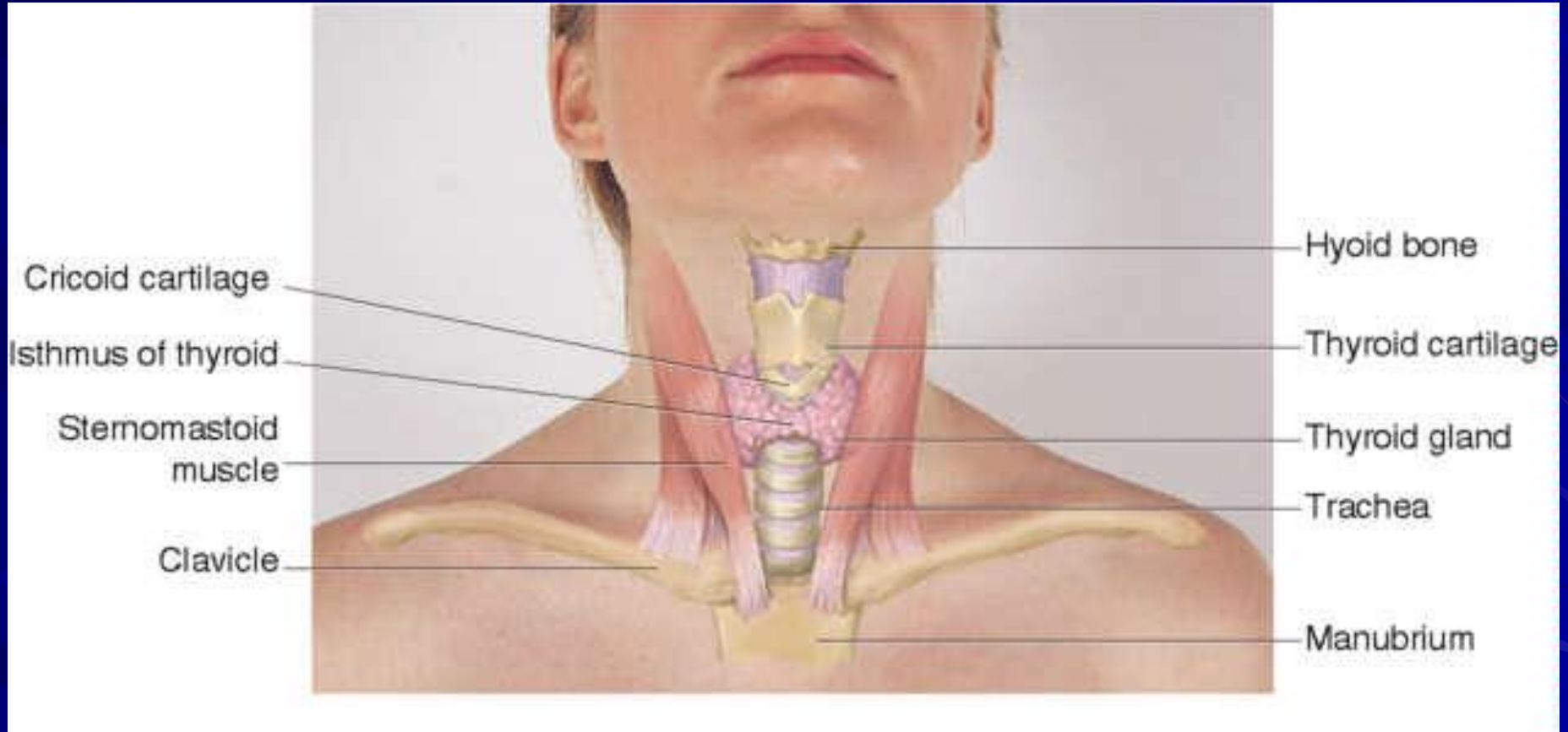
- ledge of the chin (*protuberantio mentalis*),
- foundation of the jaw (*basis mandibulae*) and its branch (*ramus mandibulae*),
- external acoustic duct,
- mastoid process,
- linea nuchea superior,
- external occipital ledge (*protuberantia occipitalis externa*) or the most prominent point of this ledge - the Inion.

Inferior border of the Neck



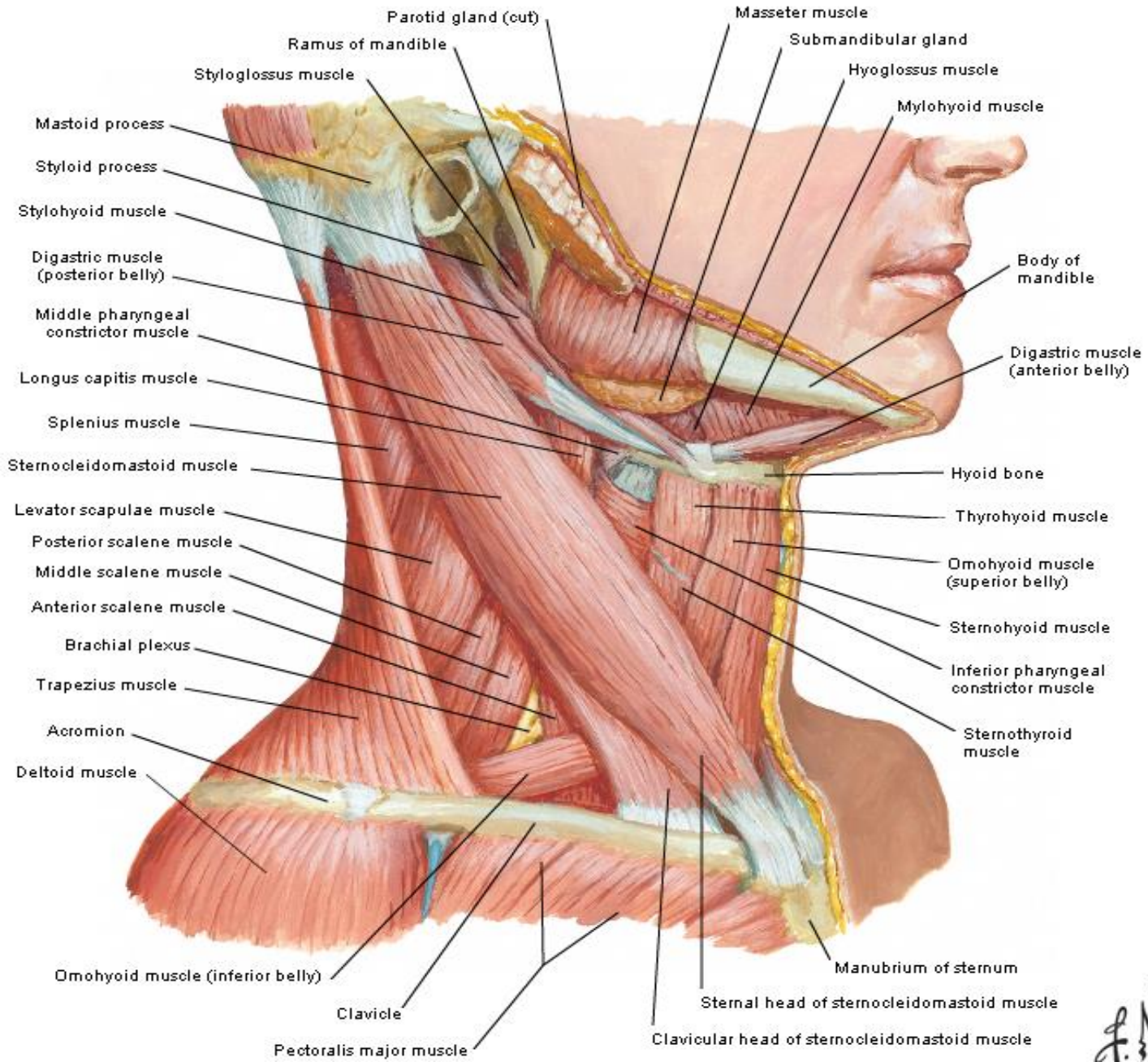
- jugular notch of the sternal bone
- superior border of clavicle
- acromial process of the scapula
- imaginary line between the acromion and spinal process of the 7th cervical vertebra

Cartilages of the Neck



Muscles of Neck

Lateral View



Regions of the Neck

Division:

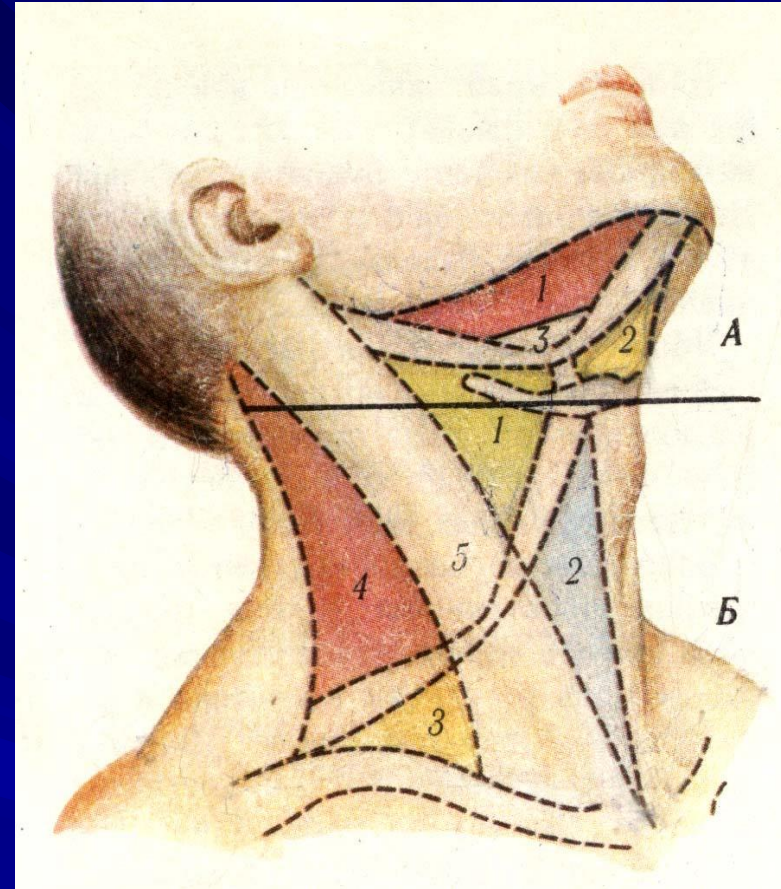
- anterior;
- posterior.

Border between:

- Imaginary line drawn between the apex of the mastoid process and acromion,
or
- Frontal plane passing through the transverse process of the cervical department of the vertebral column,
or
- Lateral margins of the trapezoid muscle.

This division has also anatomic base: deep fascia of the neck is fasten to transversal processes.

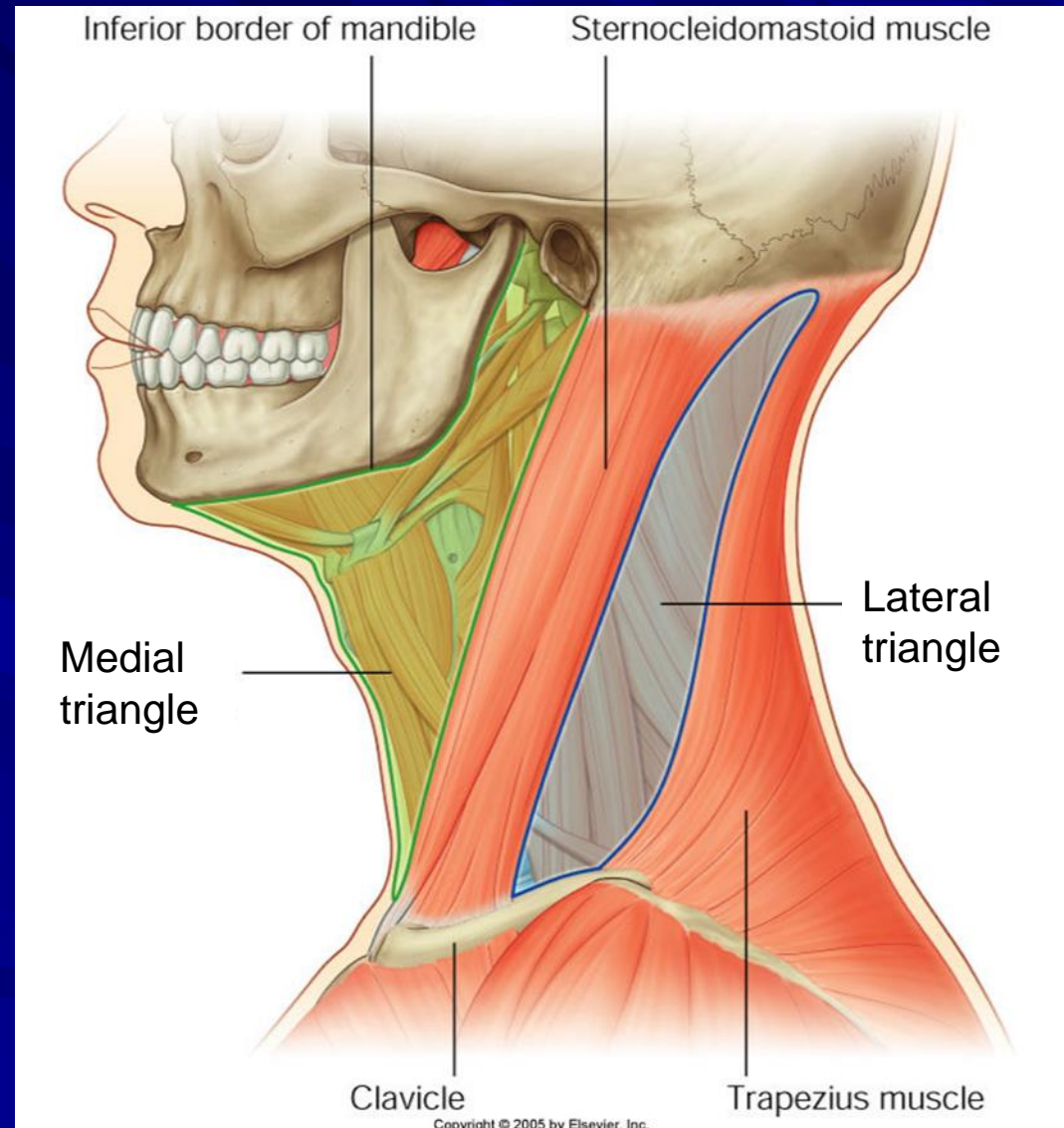
Passing through the hyoid bone horizontal line subdivides the Neck into the suprahyoid (A) and infrahyoid (B) regions.



MEDIAL (anterior) TRIANGLE OF THE NECK

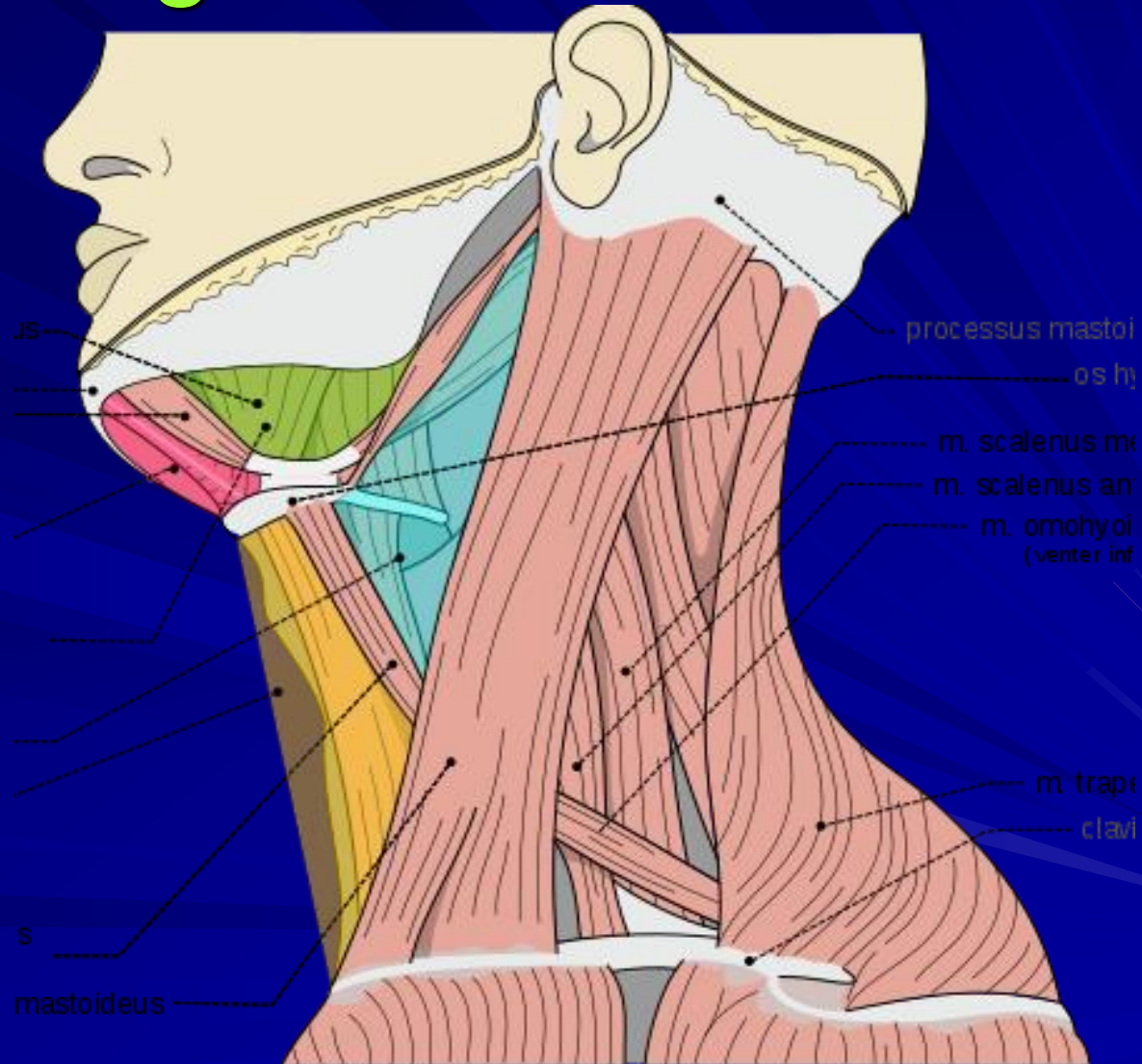
● Boundaries

- Superior - Inferior border of the mandible
- Lateral - Anterior border of the sternocleidomastoid m.
- Medial - Midline of the neck



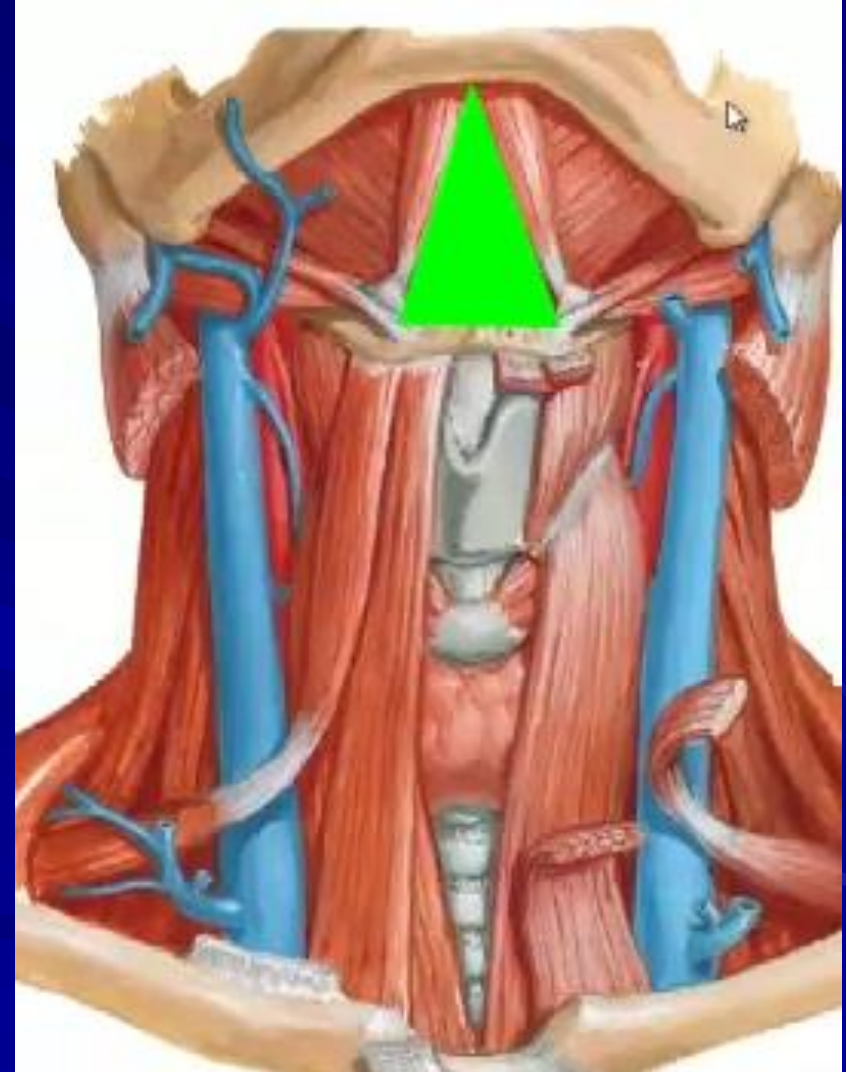
Medial Triangle: Boundaries

- Subdivisions:
 - **Suprahyoid region**
 - Submandibular (digastric) triangle
 - Submental triangle
 - Lingual (Pyrohov) triangle
 - **Infrahyoid region**
 - Carotid triangle
 - Omotracheal (muscular) triangle



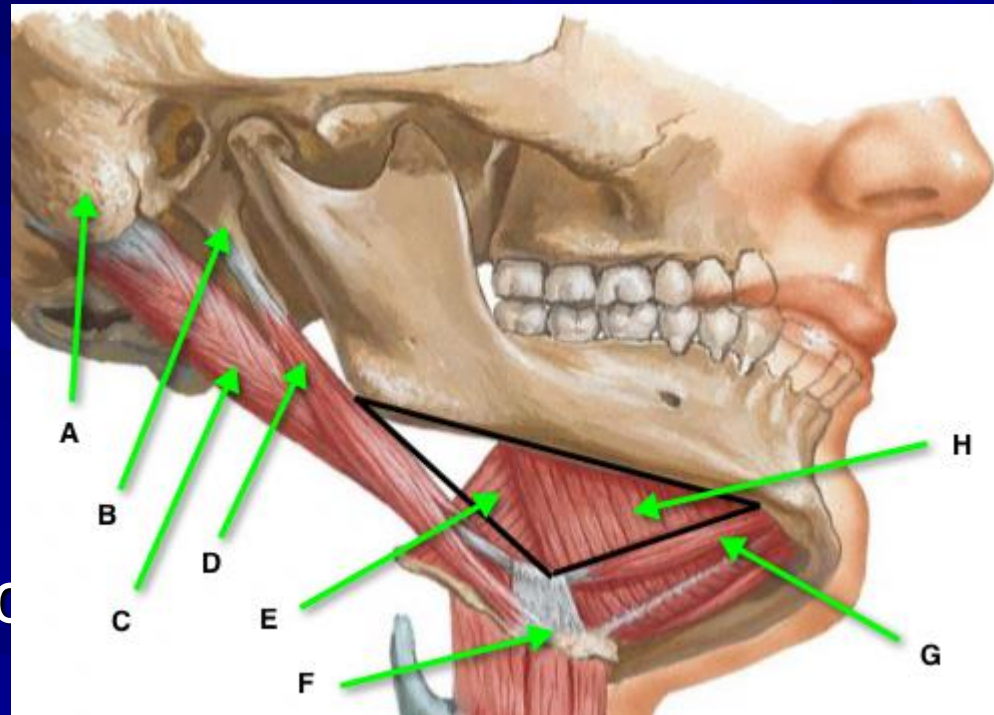
The Submental Triangle

- Located between the two anterior bellies of digastric muscles. Posterior and inferior: limited by hyoid bone.
- Structures
 - submental lymph nodes - drain the floor of the mouth.
 - mylohyoid muscle arise from the body of the hyoid bone and insert into the mylohyoid line of the inside of the mandible.



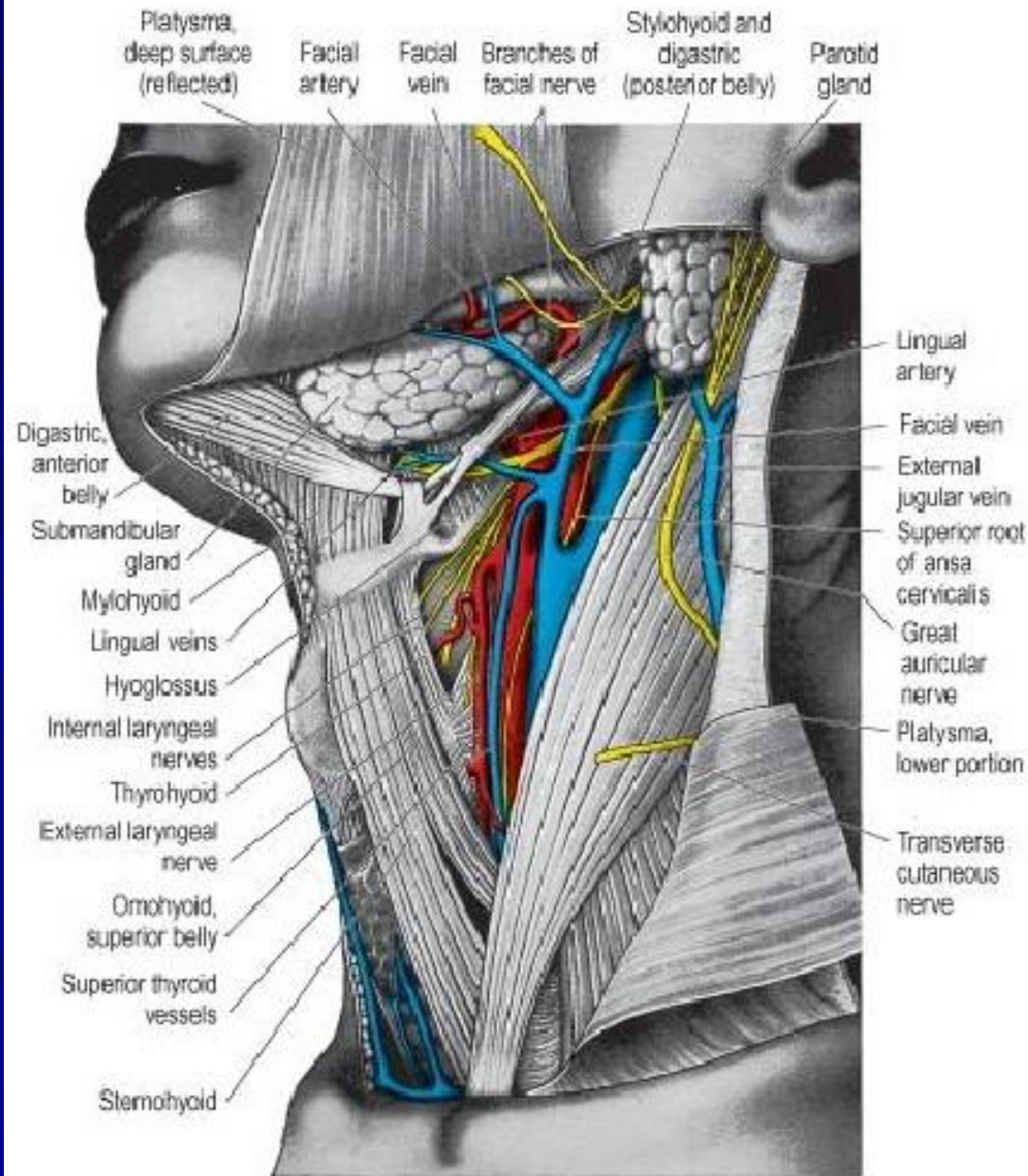
Submandibular triangle: Boundaries

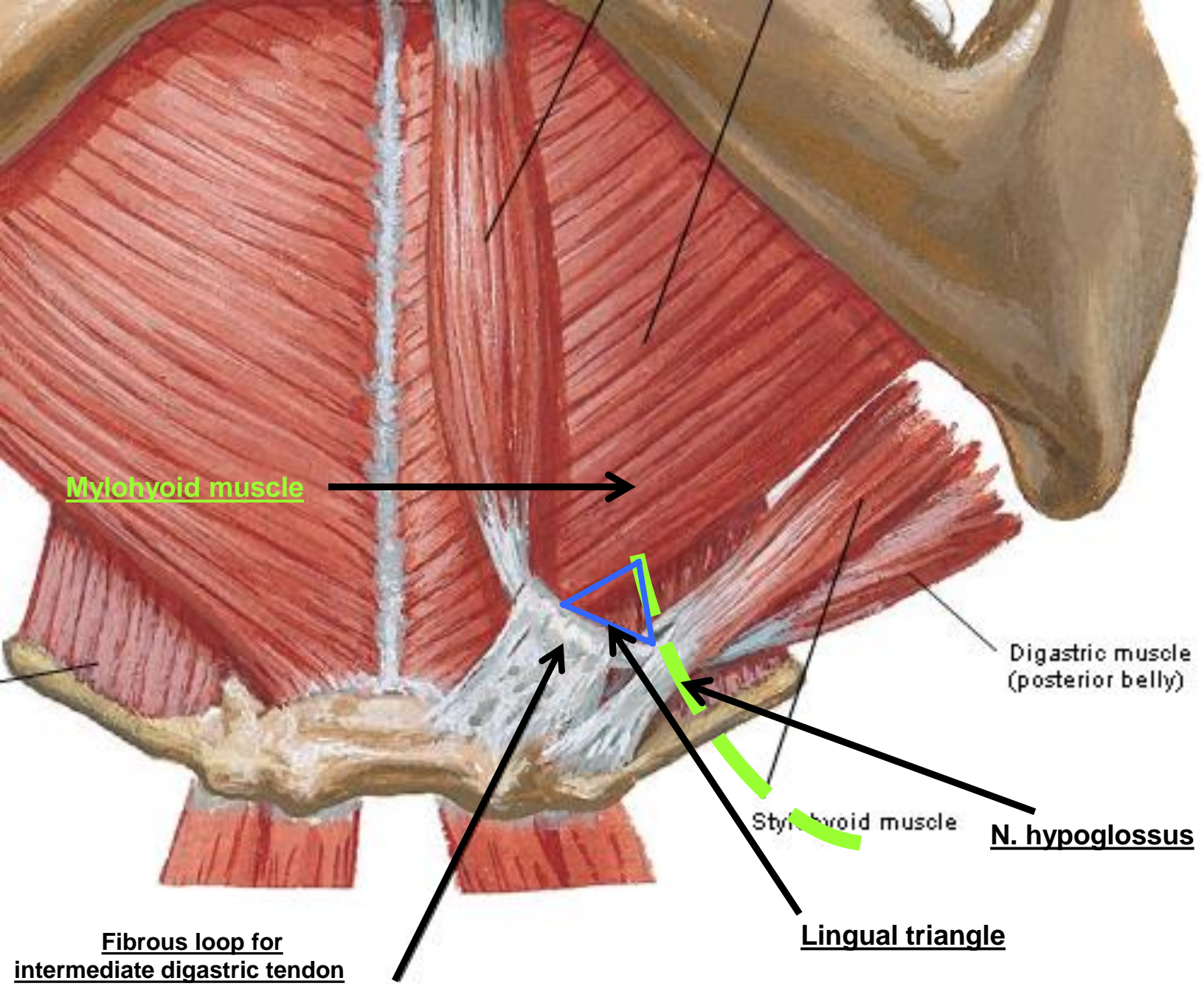
- Also known as digastric triangle
- **Superiorly**(base) – base of mandibla
- **Anteroinferiorly** – anterior belly of digastric m.
- **Posteroinferiorly** – posterior belly of digastric m. & stylohyoid



Submandibular triangle

- contents of the submandibular triangle are structures passing through:
 - facial artery
 - lingual nerve and submandibular ganglion
 - submandibular duct
 - lingual artery
 - hypoglossal nerve (XII)
- the lingual nerve and submandibular duct pass through a gap between the hypoglossal and mylohyoid muscles
- the lingual artery passes deep to the hyoglossus muscle.





Mylohyoid muscle

Digastric muscle
(posterior belly)

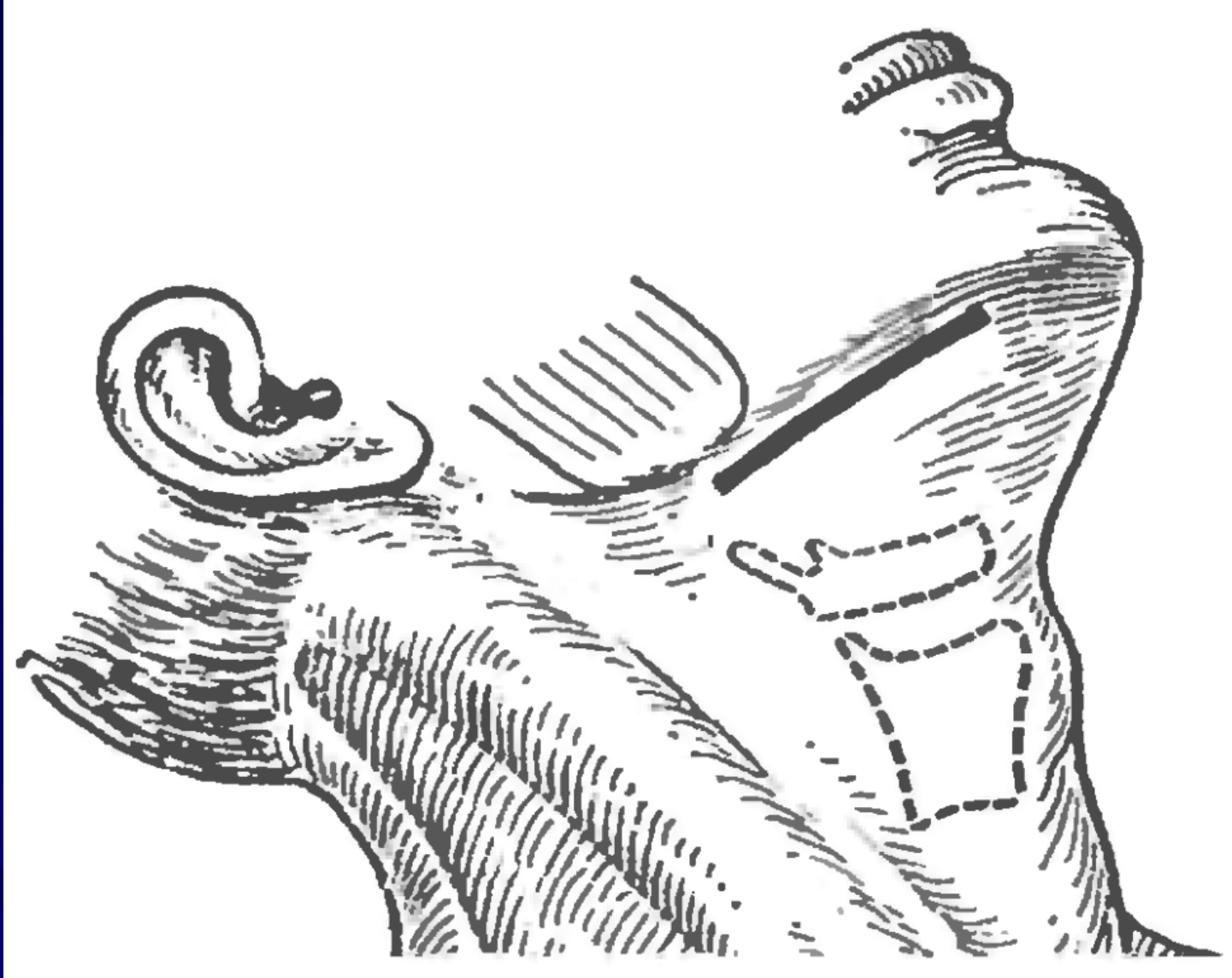
Stylohyoid muscle

N. hypoglossus

Fibrous loop for
intermediate digastric tendon

Lingual triangle

Ligation of the lingual artery



Access line to lingual artery

Carotid triangle

- Trigonum caroticum or trigonum Beclare
- Borders:
 - Medial: Superior belly of the omohyoid m.
 - Lateral: Medial margin of the SCM
 - Superior: Posterior belly of the digastric m.

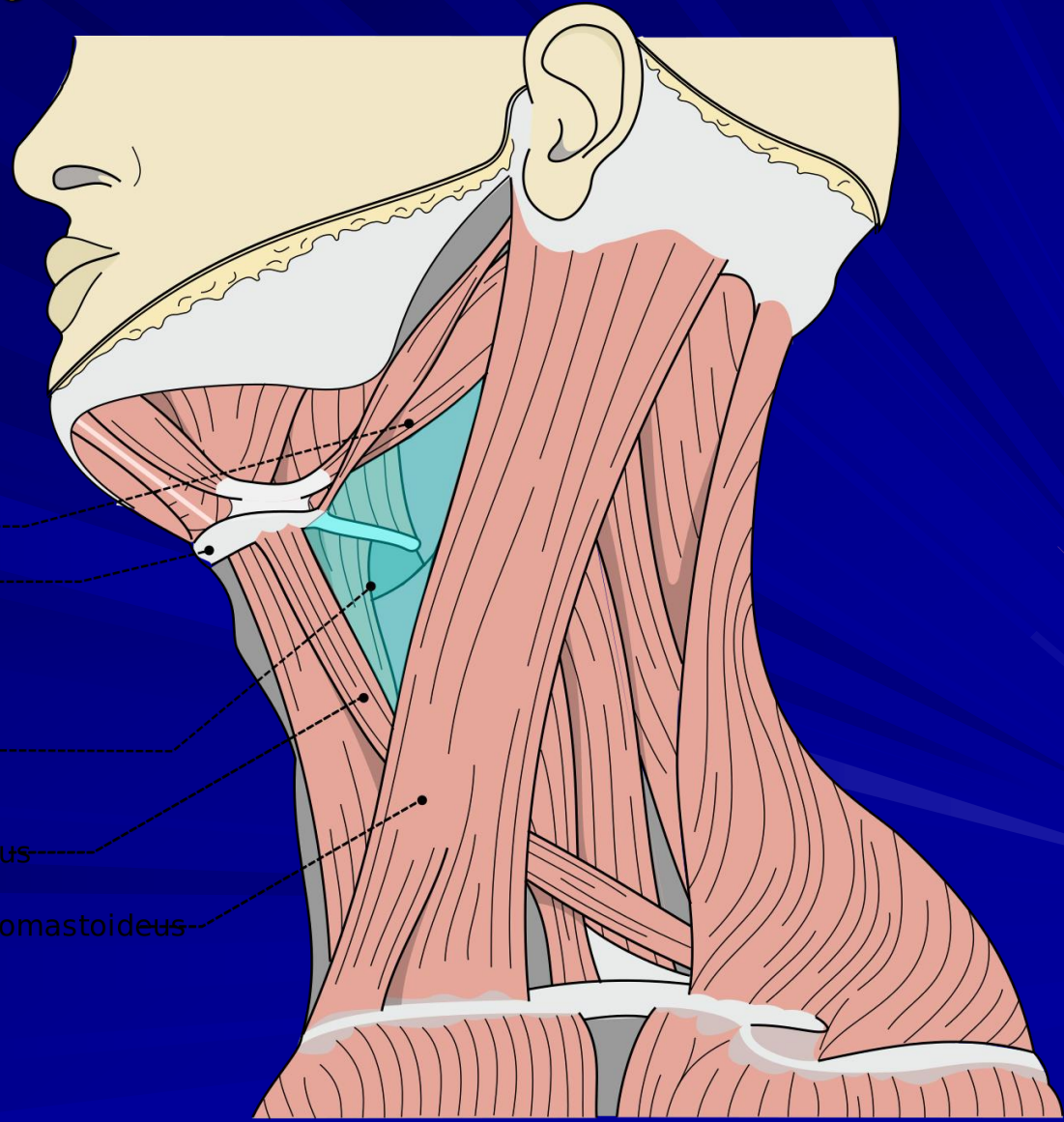
Carotid triangle

m. digastricus

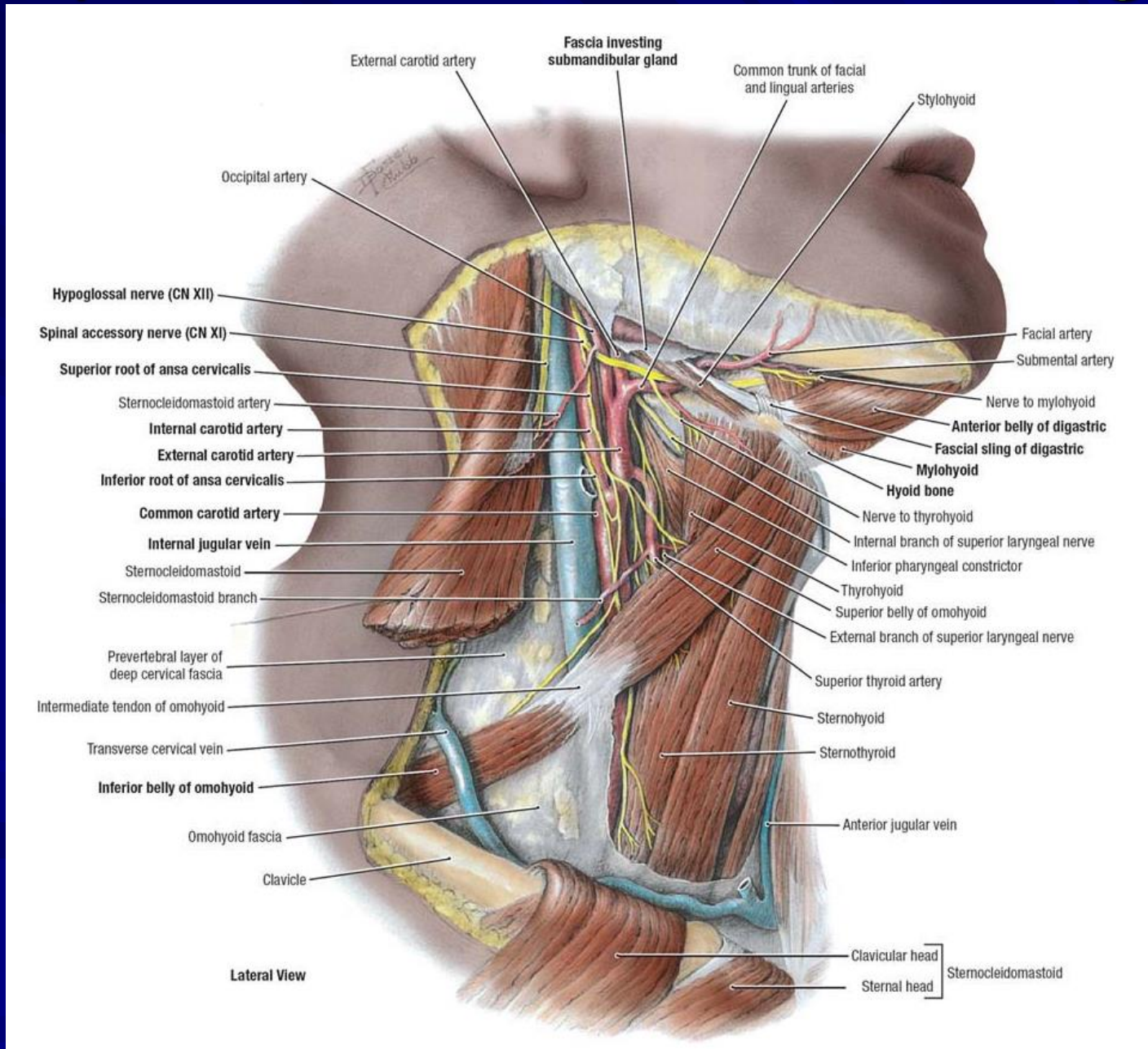
os hyoideum

m. omohyoideus
(venter superior)

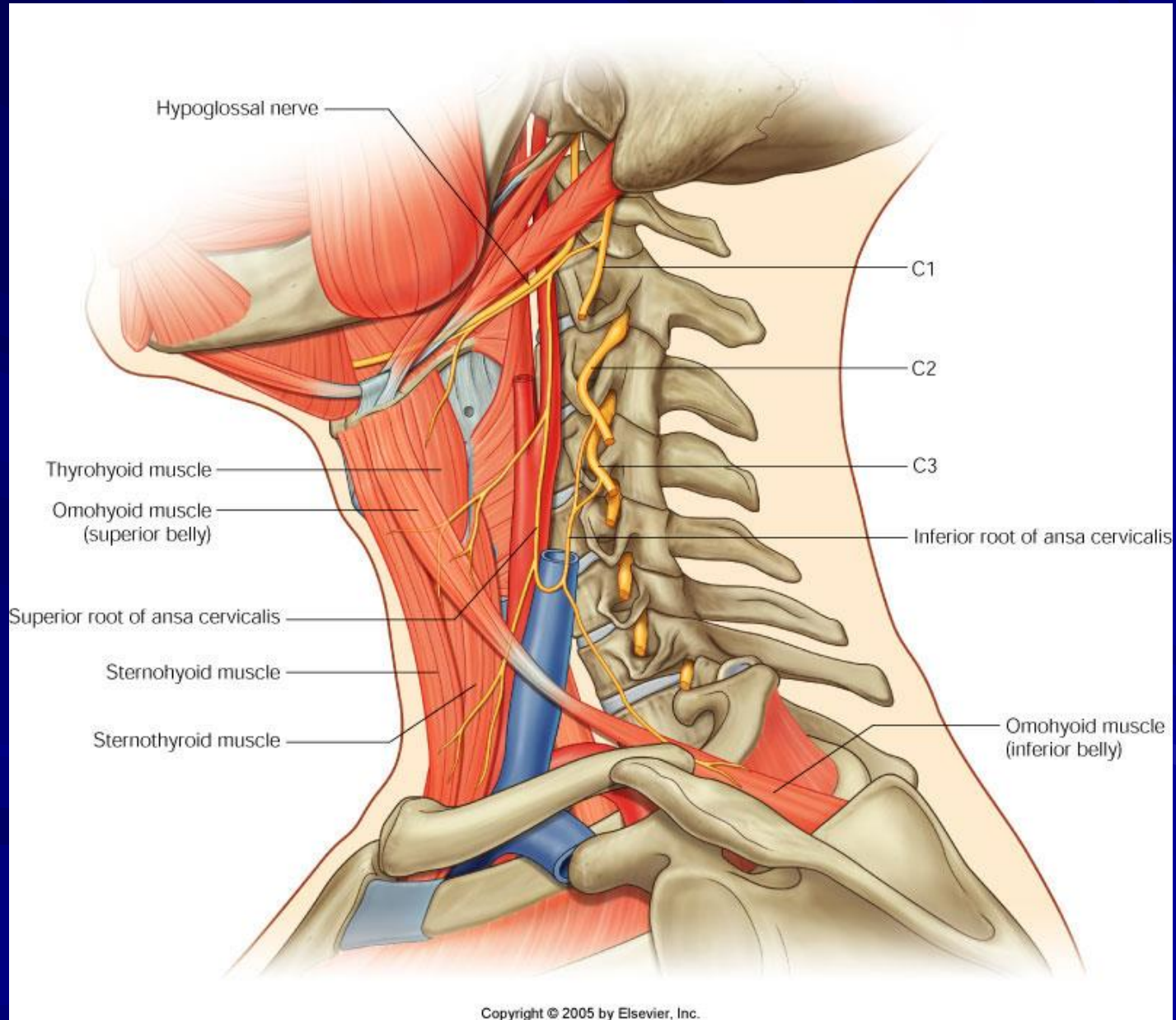
m. sternocleidomastoideus



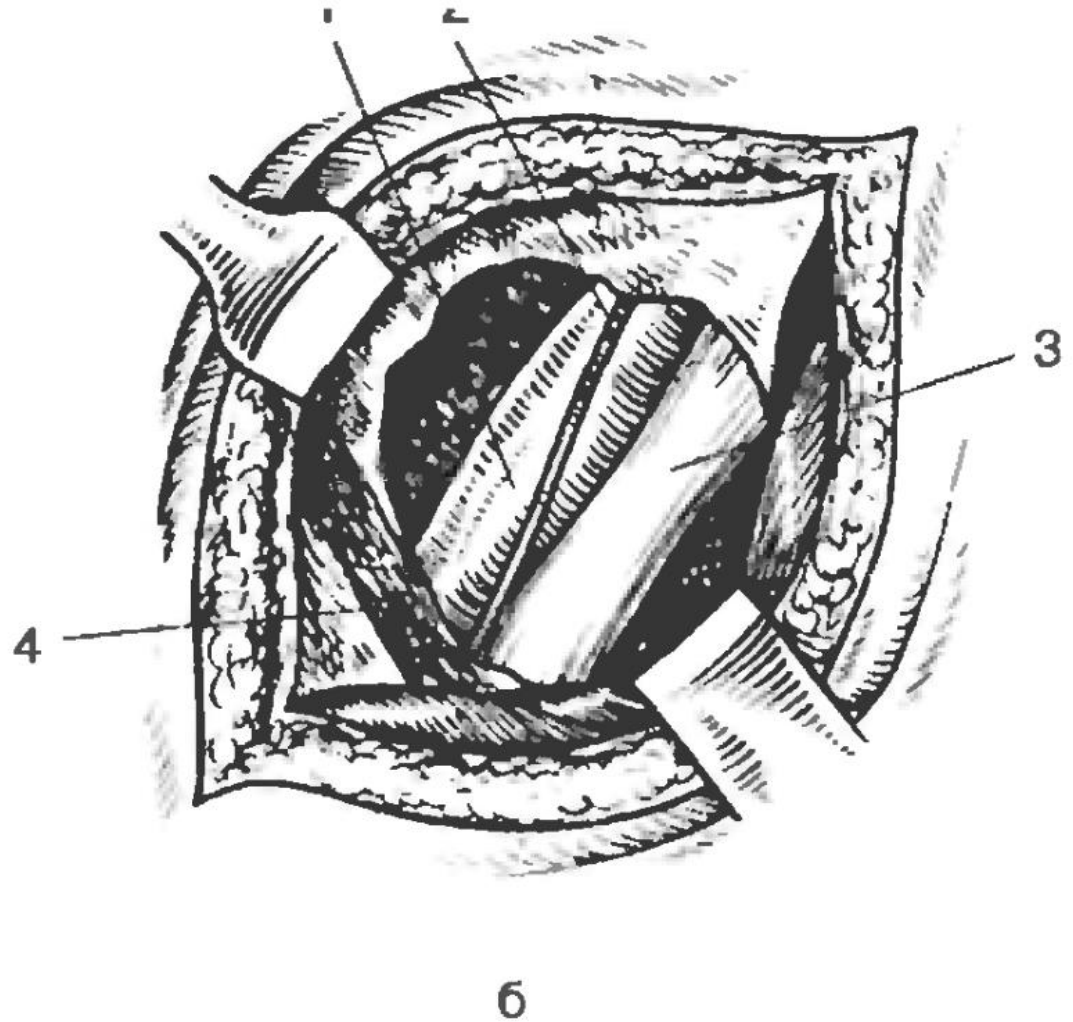
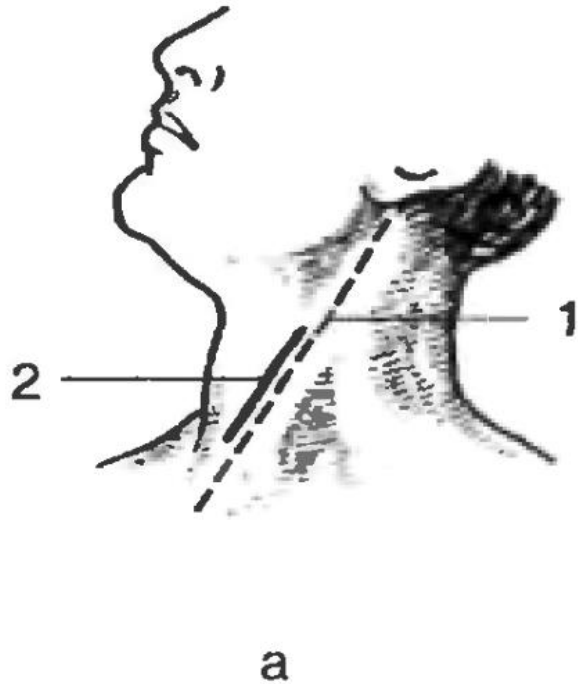
Deep dissection in carotid triangle



Nerves within the Carotid Triangle



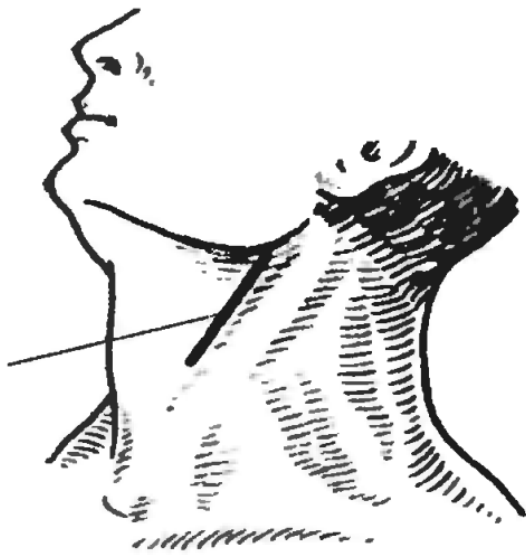
Denudation and ligation of the common carotid artery



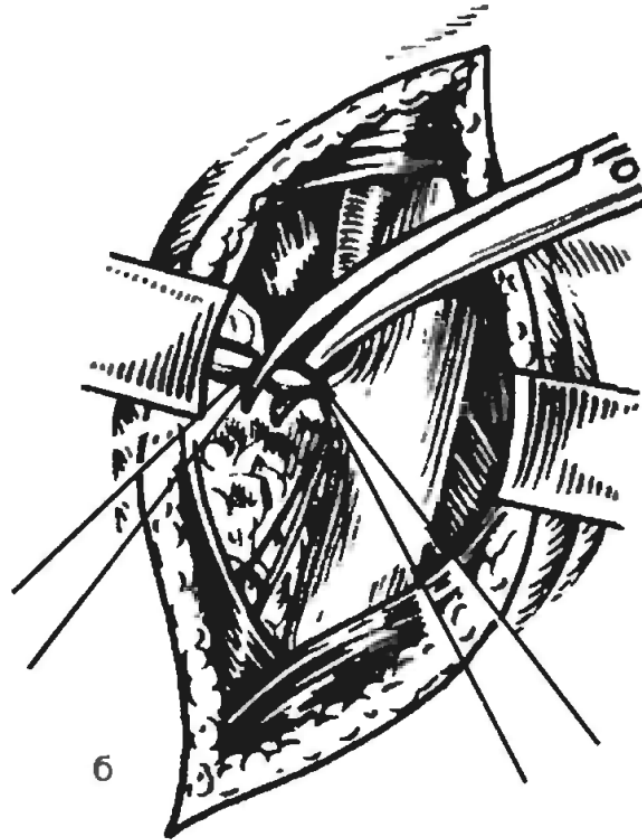
Access line to common carotid artery

Topography of neurovascular bundle

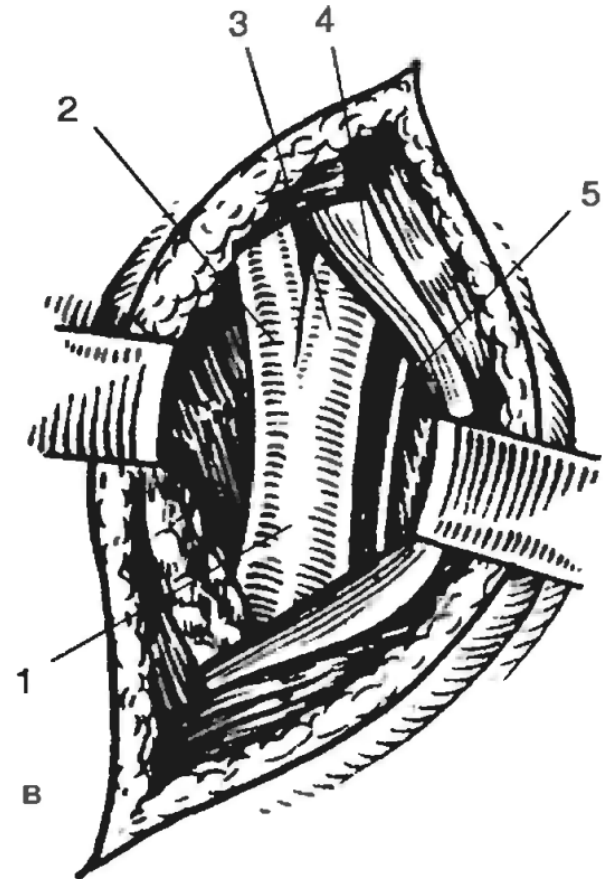
Denudation and ligation of the external carotid artery



a



b



B

Access line to external carotid artery

Ligation and cutting of the facial artery

Topography of branches of common carotid artery

Omotracheal (muscular) triangle

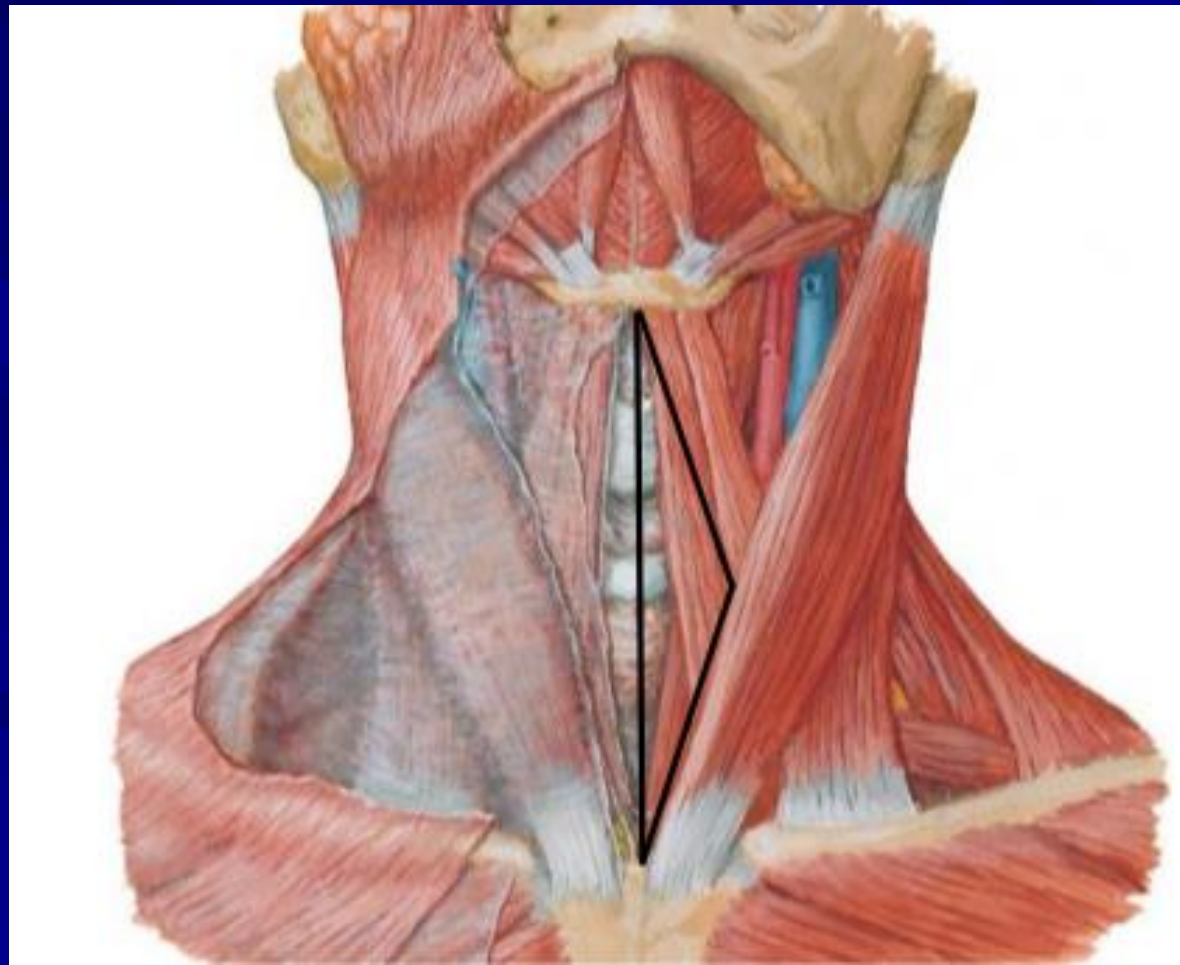
Borders:

Superiolateral: Superior belly of the omohyoid muscle

Medial: Anterior median line of the Neck

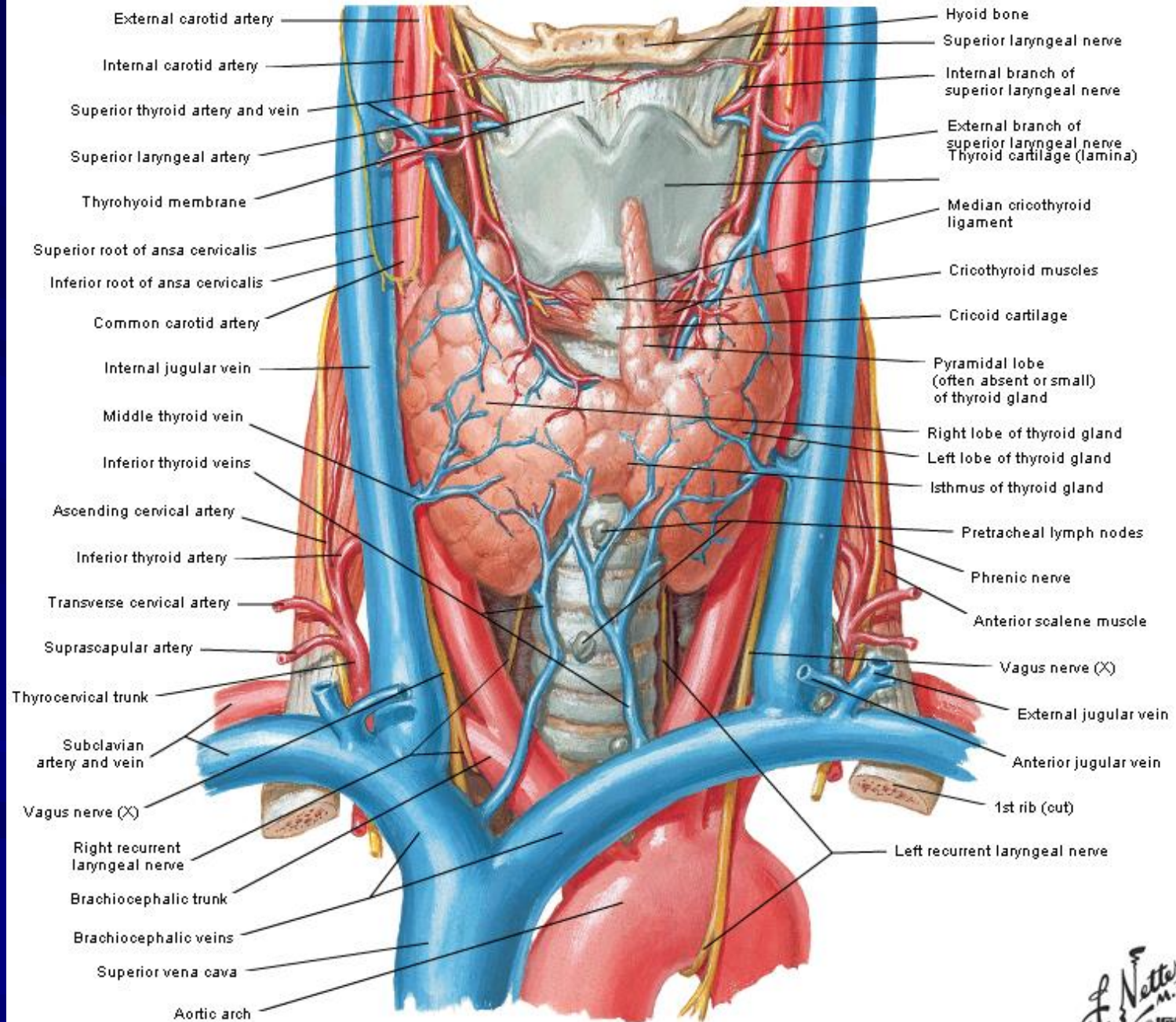
Inferior: Anterior border of the SCM

Content: thyroid and parathyroid glands, trachea, esophagus and sympathetic nerve trunk.



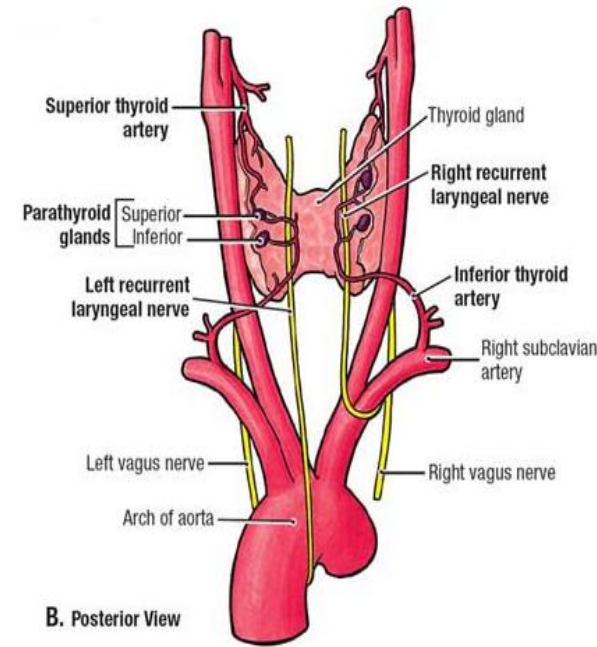
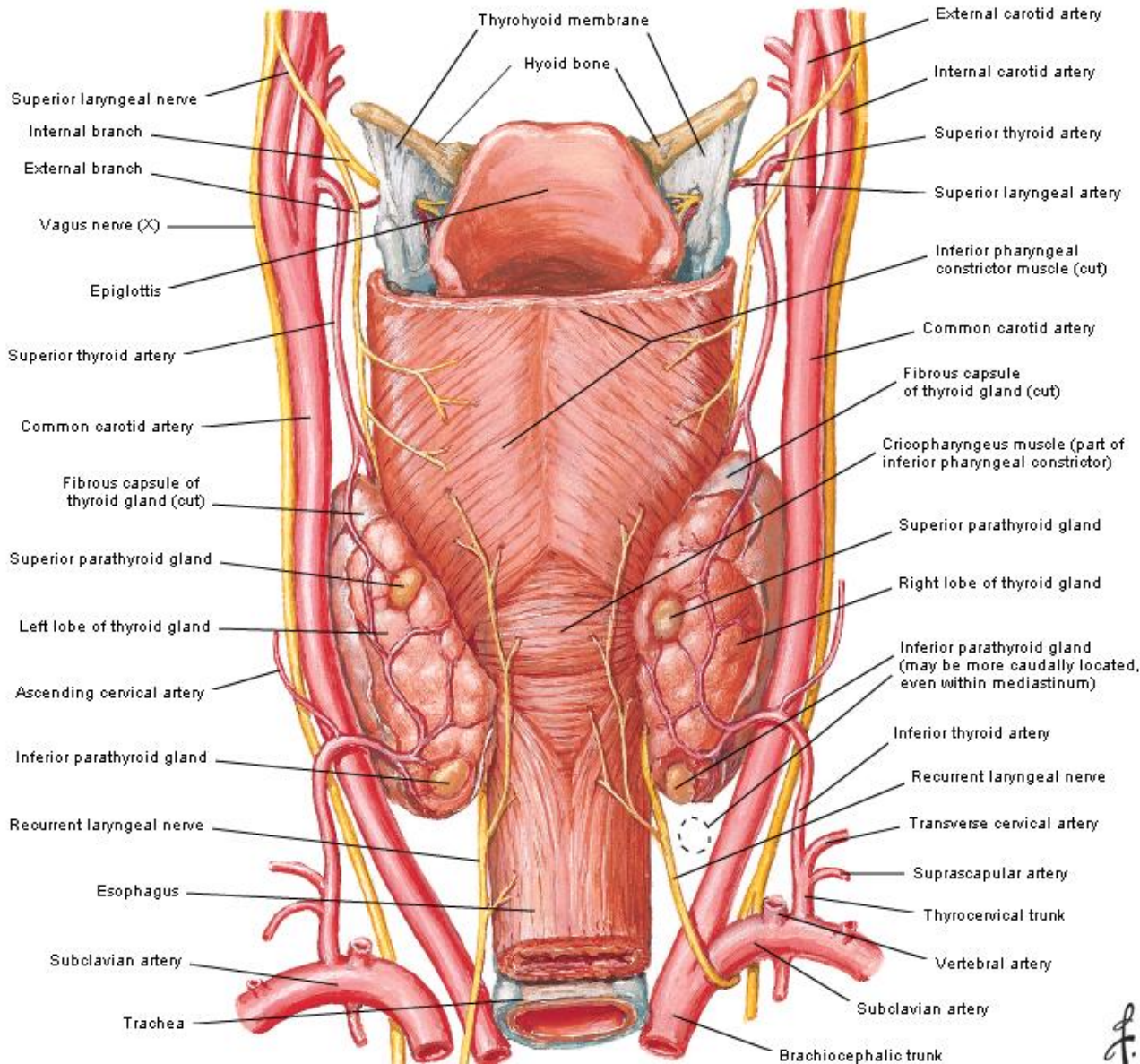
Thyroid Gland

Anterior View



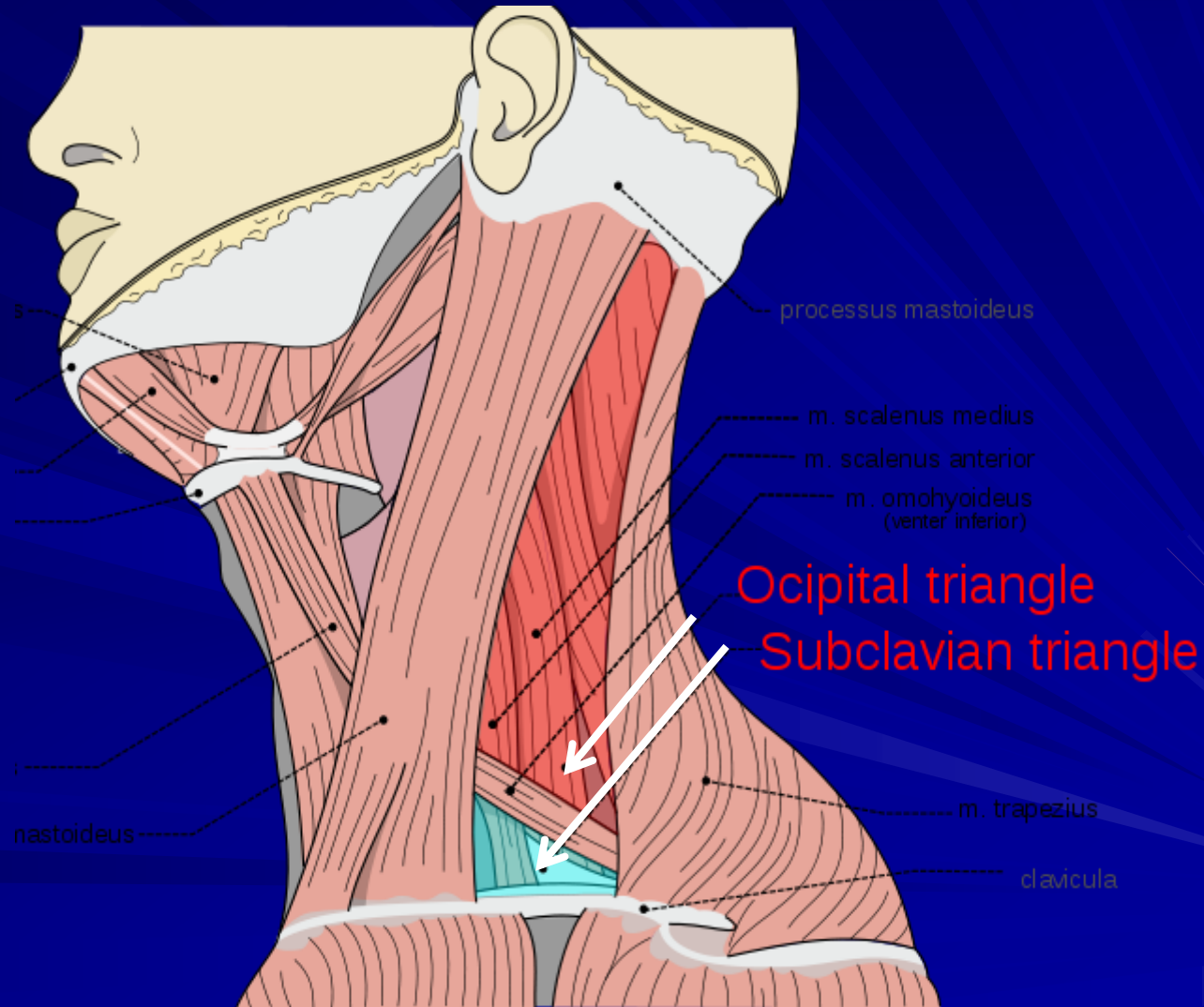
Parathyroid Glands

Posterior View

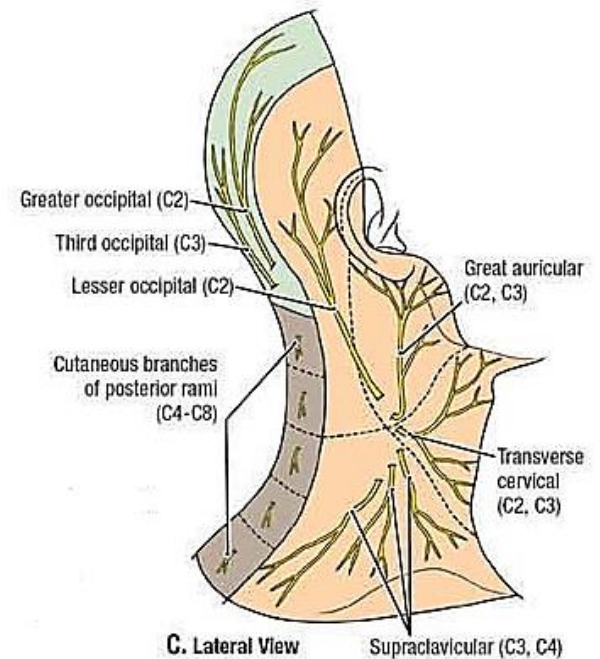
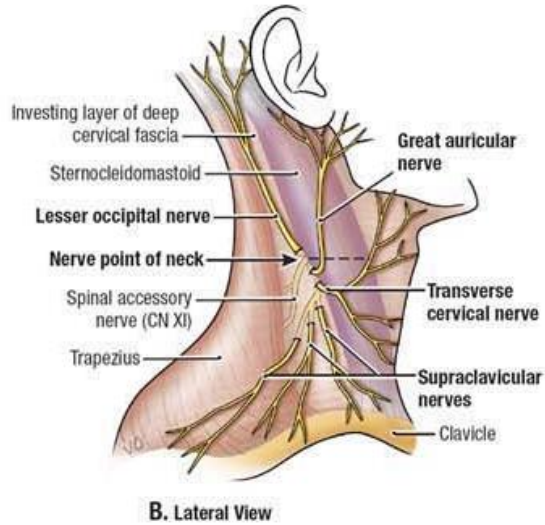
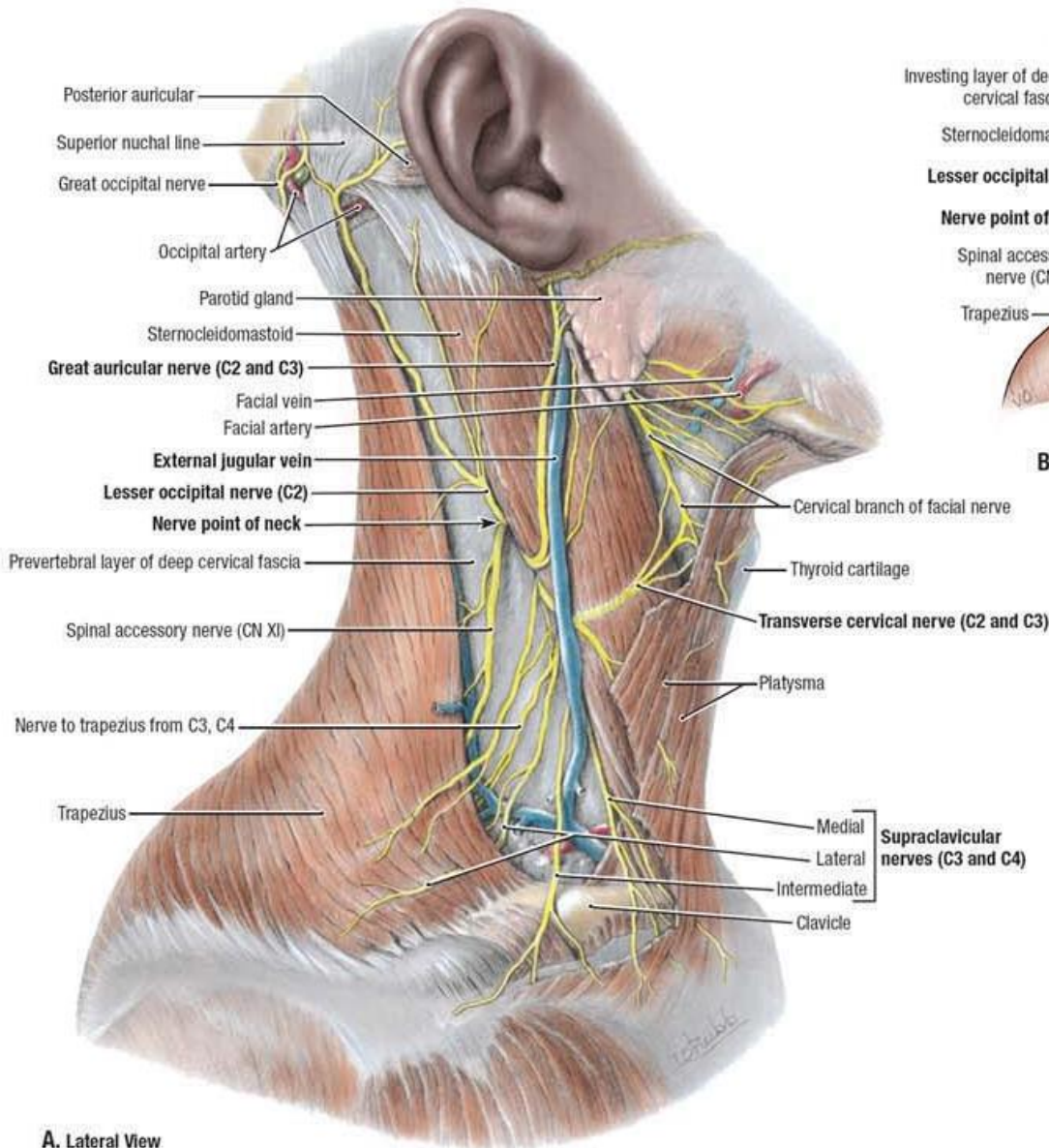


Lateral Triangle: Boundaries

- The lateral (or posterior) triangle is limited by the superior edge of the clavicle, back edge of the sternocleidomastoid muscle and trapezoid muscle.
- Within the borders of the lateral triangle omotrachezoid, or occipital and omoclavicular, or subclavian, triangles are allocated.



Omotrapezoid triangle

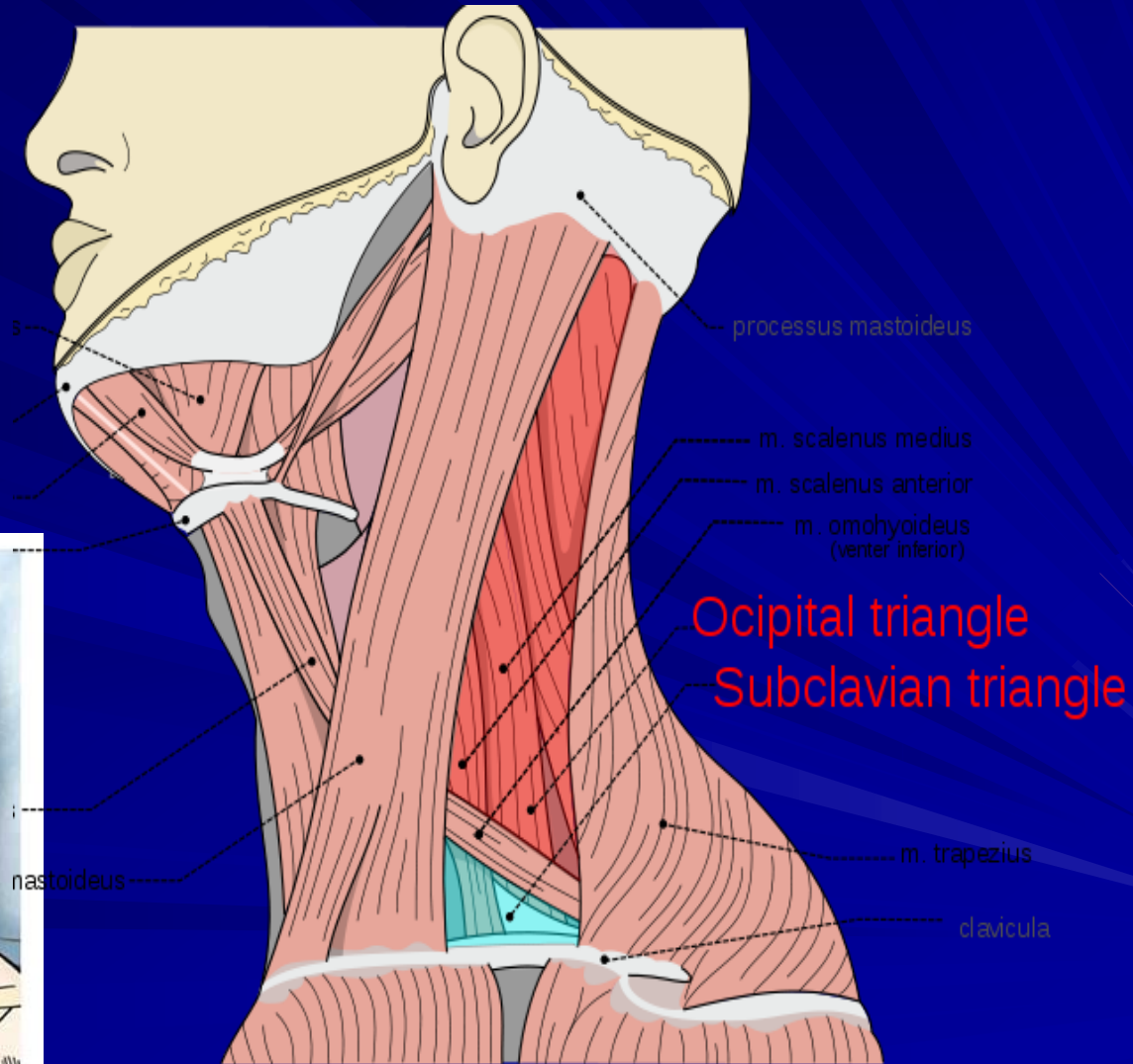
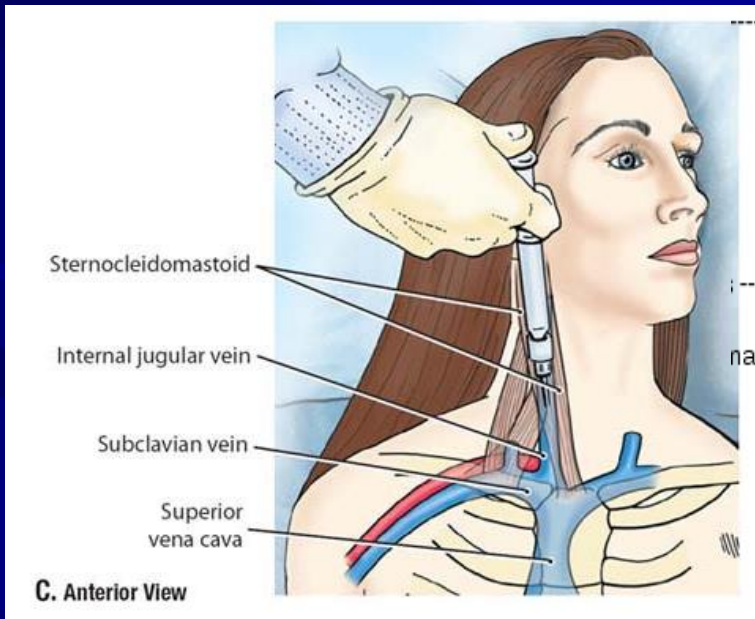


Omoclavicular triangle

Borders:

- Medial: Inferior part of SCM
- Lateral: Inferior belly of the omohyoid m.
- Inferior: Superior margin of clavicle

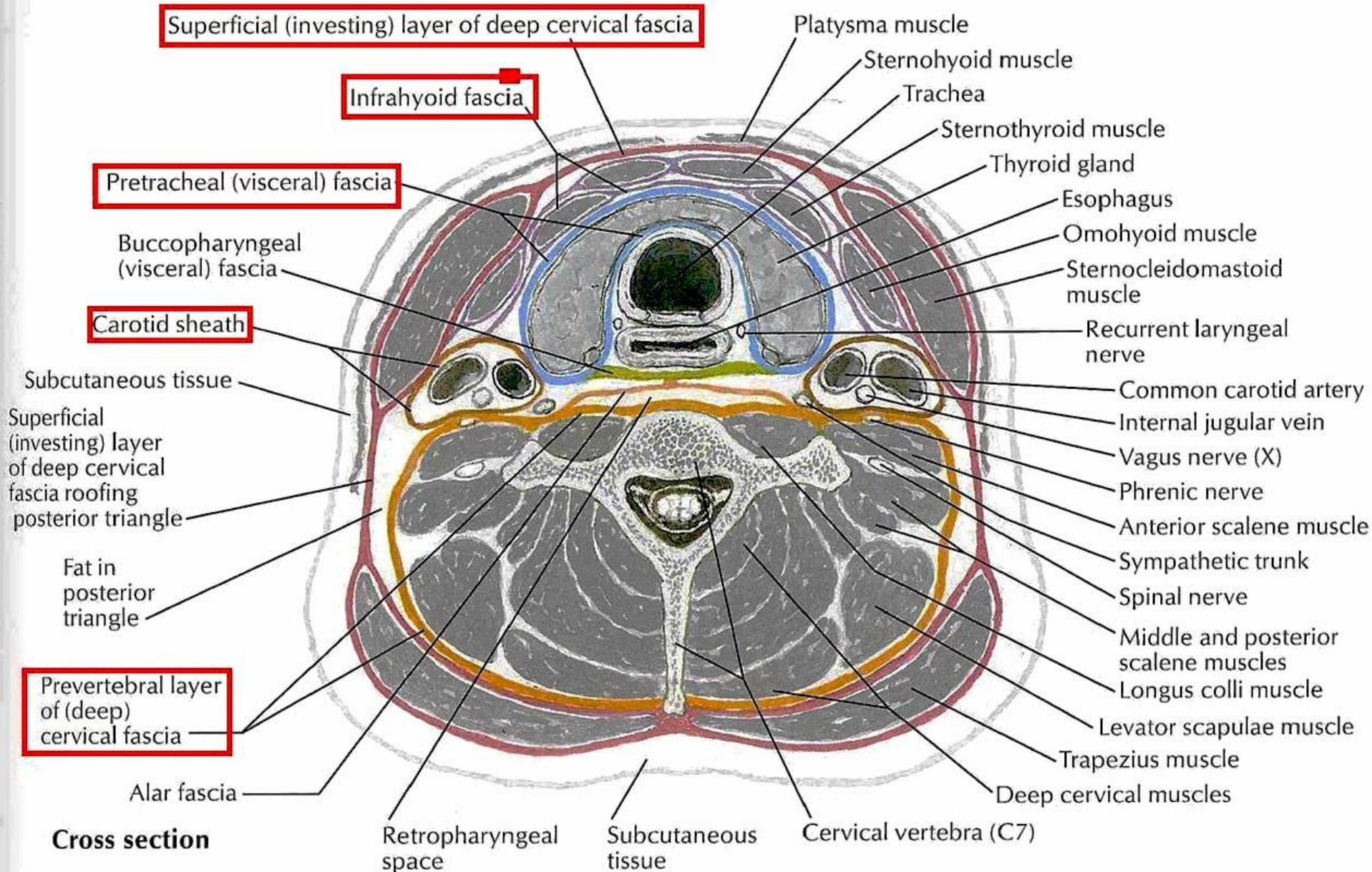
Floor: Scalene muscle
a.&v. subclavia



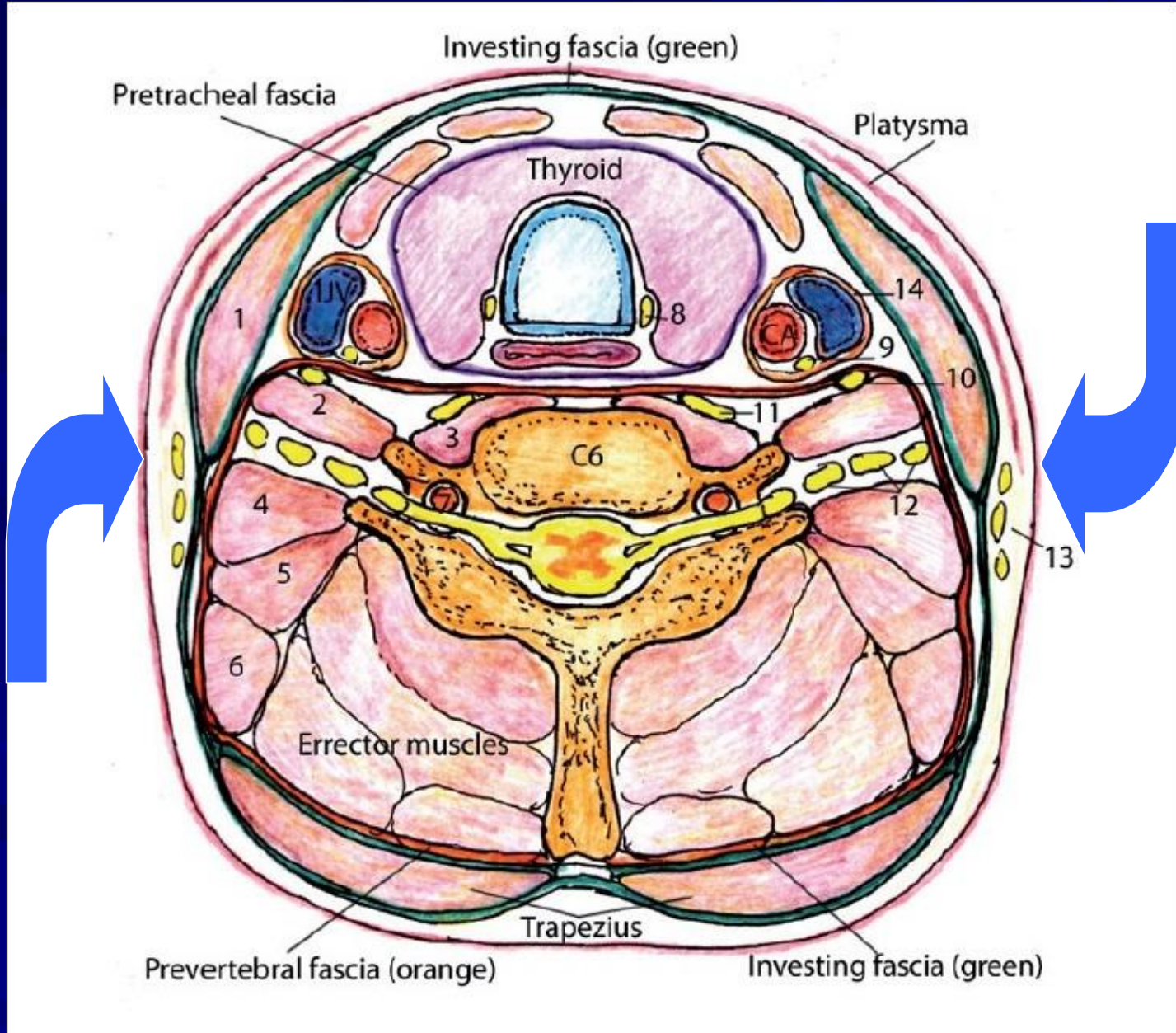
Classification of cervical fasciae

1. Superficial fascia.
2. Investing, or Deep, fascia.
 - a. *Anterior, or superficial, layer* of investing fascia;
 - b. *Middle layer* of investing fascia, or *fascia of infrahyoid muscles*, because it is in front and below hyoid bone only;
 - c. *Prevertebral layer* (*posterior, or deep, layer* of investing f.);
3. Visceral fascia, or endocervical fascia, (*pretracheal and buccopharyngeal layers*).

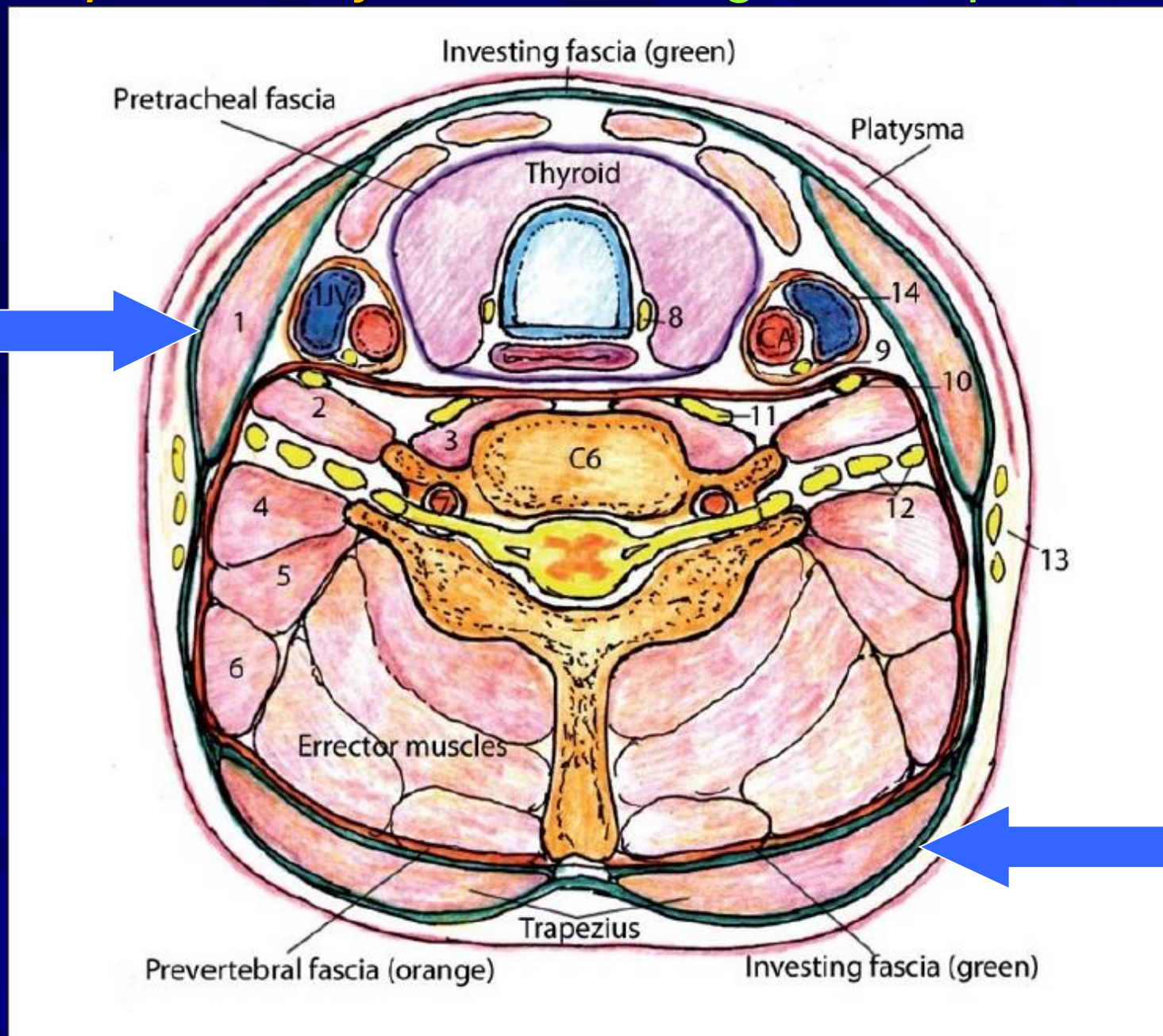
Fasciae of the Neck



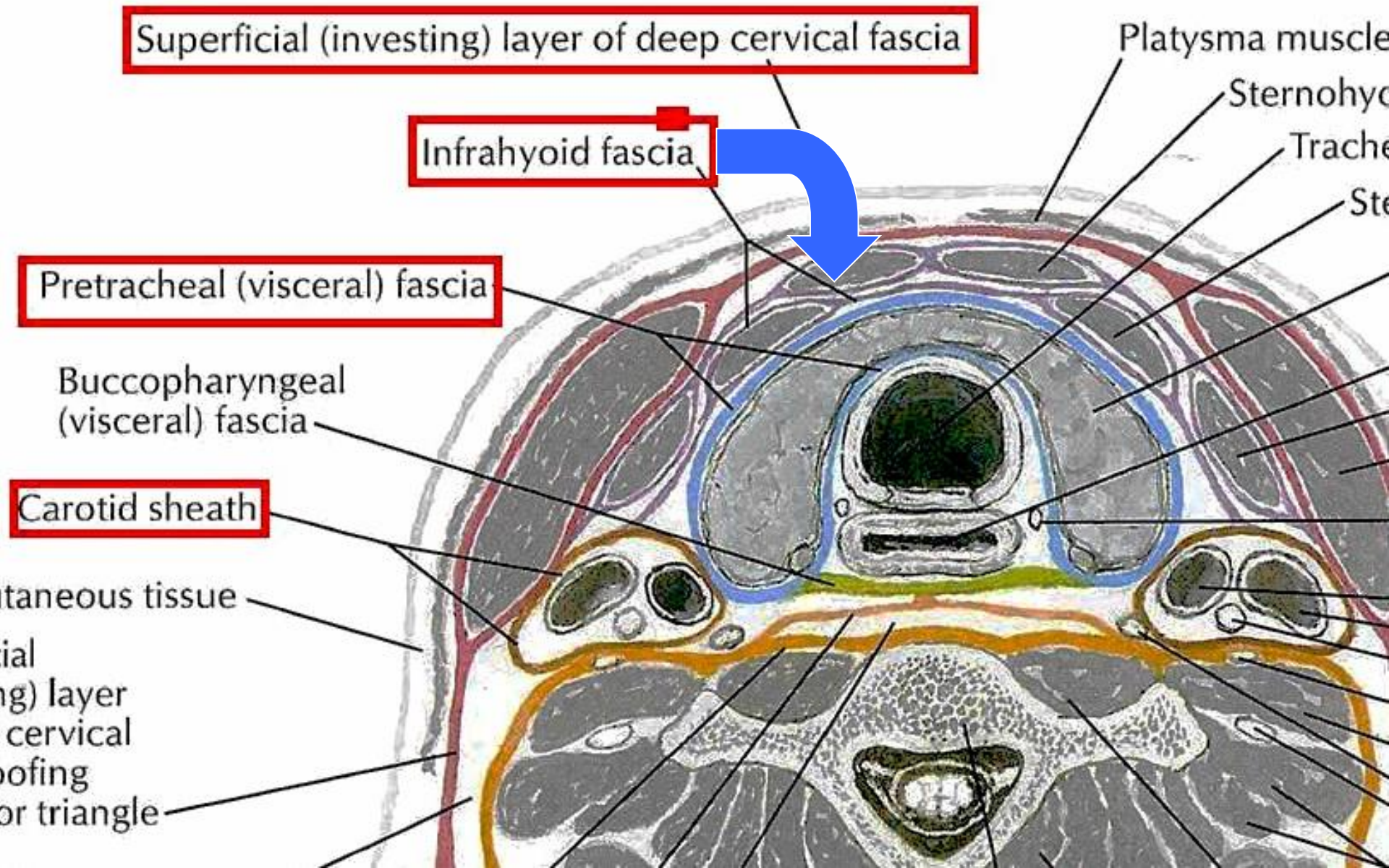
1. Superficial cervical fascia



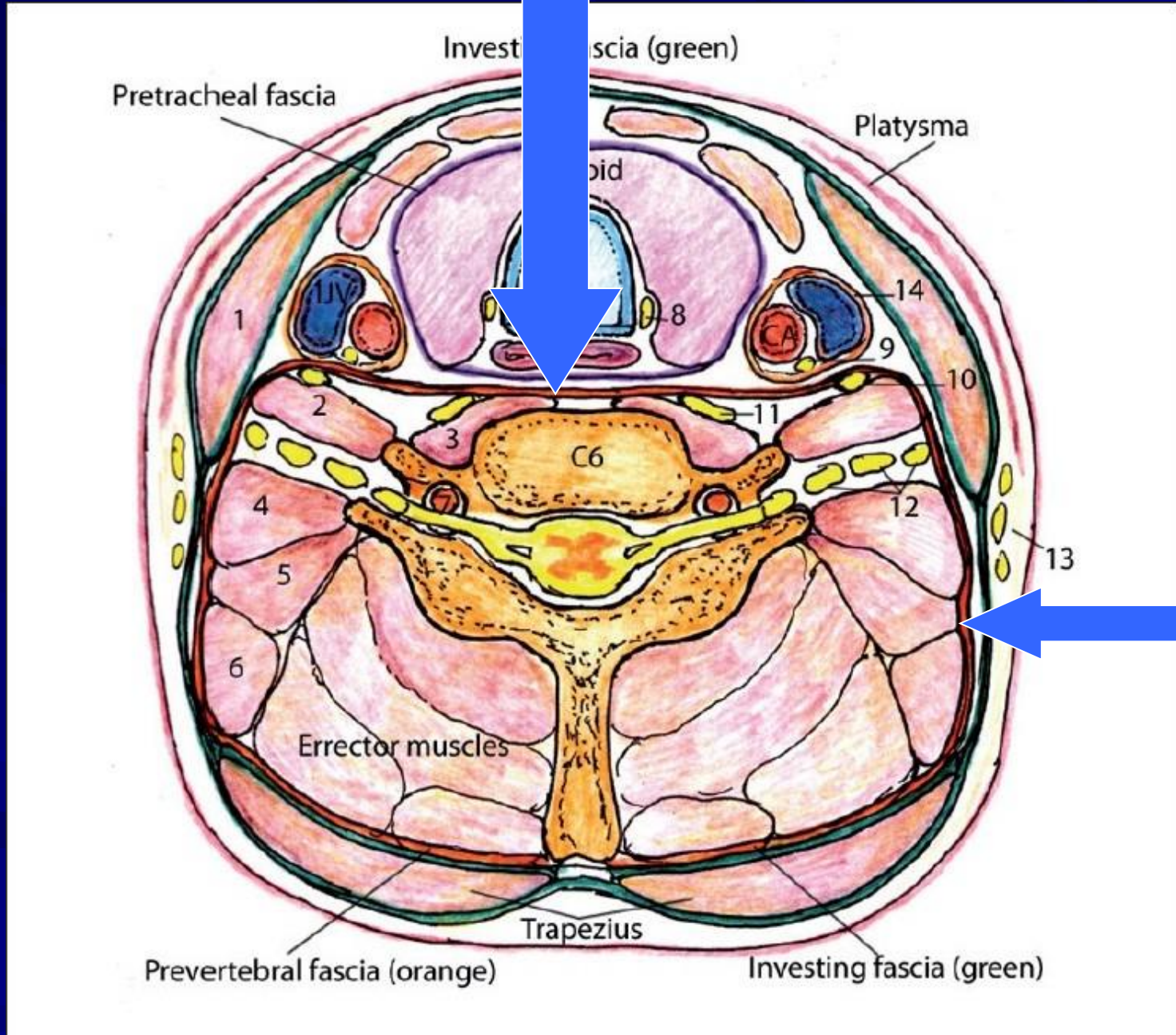
2a. Superficial layer of Investing, or Deep, Fascia



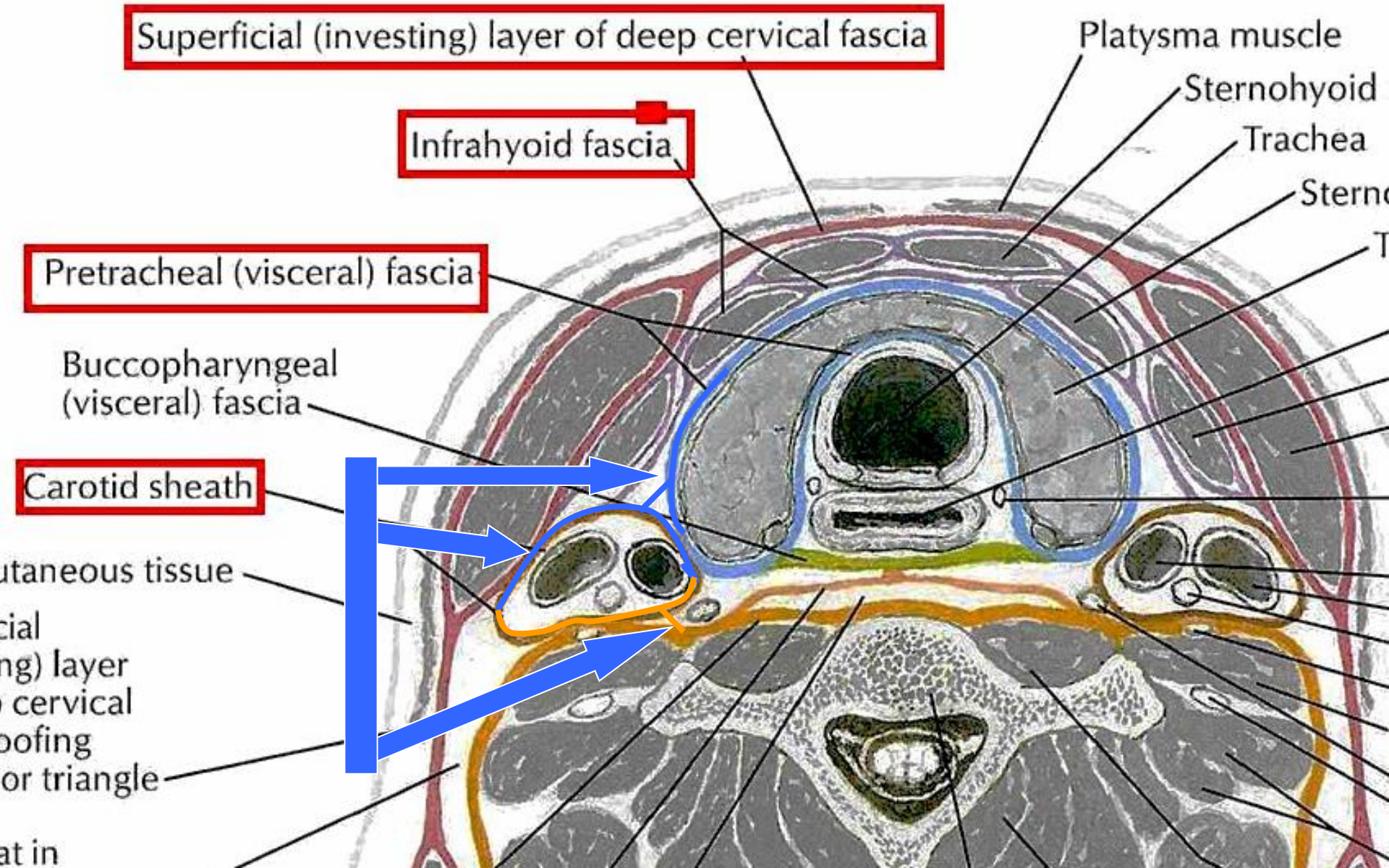
2b. Middle layer of the Investing fascia, or fascia of infrahyoid muscles



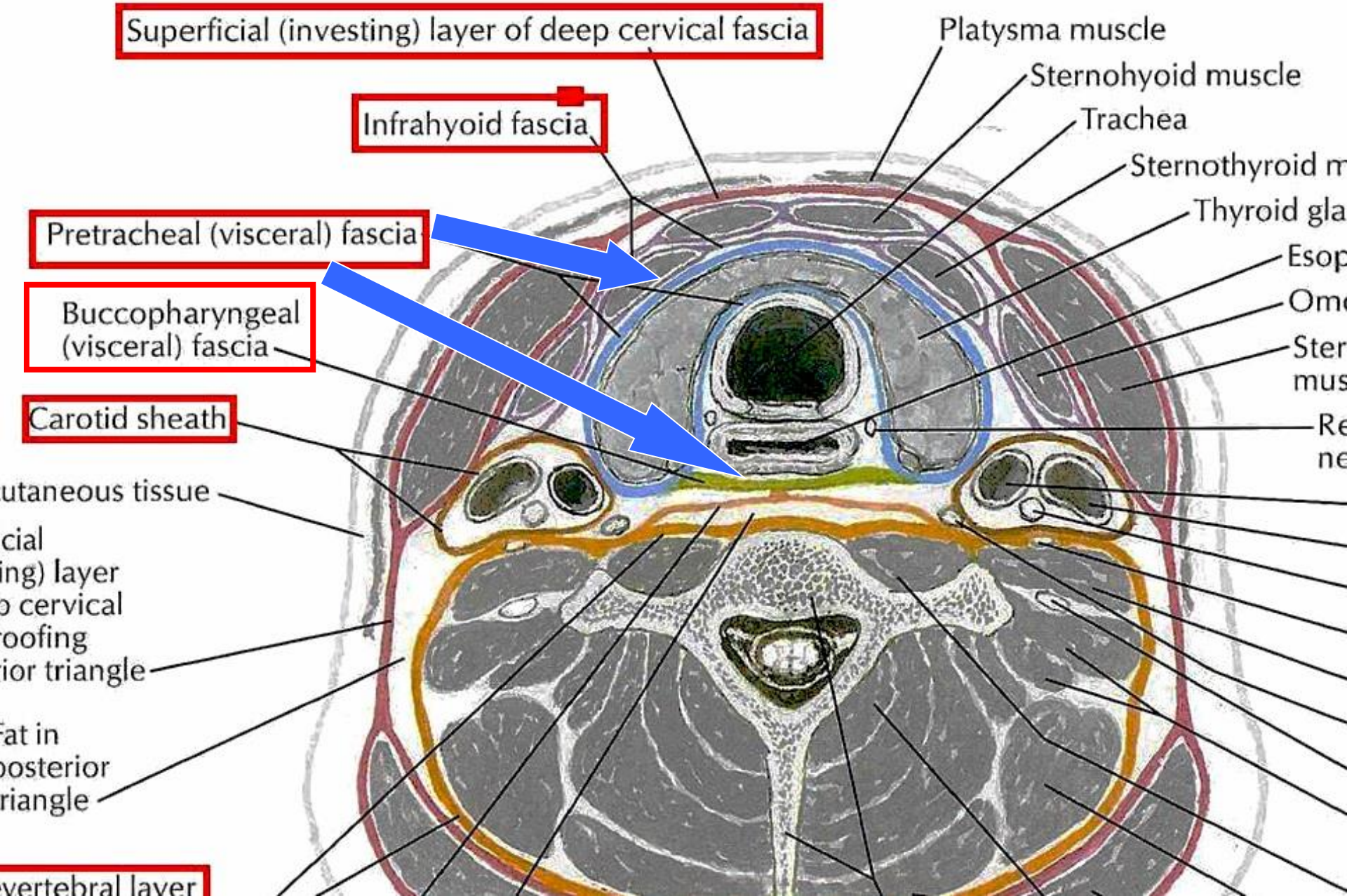
2c. Prevertebral layer of Investing, or Deep, Fascia



Carotid Sheath



3. Visceral Fascia



Sagittal section

Pharynx

Buccofaringeal f.

Retropharyngeal space

Alar fascia

Prevertebral fascia

Trachea

Esophagus

Mandible

Geniohyoid muscle

Geniohyoid fascia

Superficial (investing) fascia

Fascia of infrahyoid muscles

Pretracheal fascia

Pretracheal f.

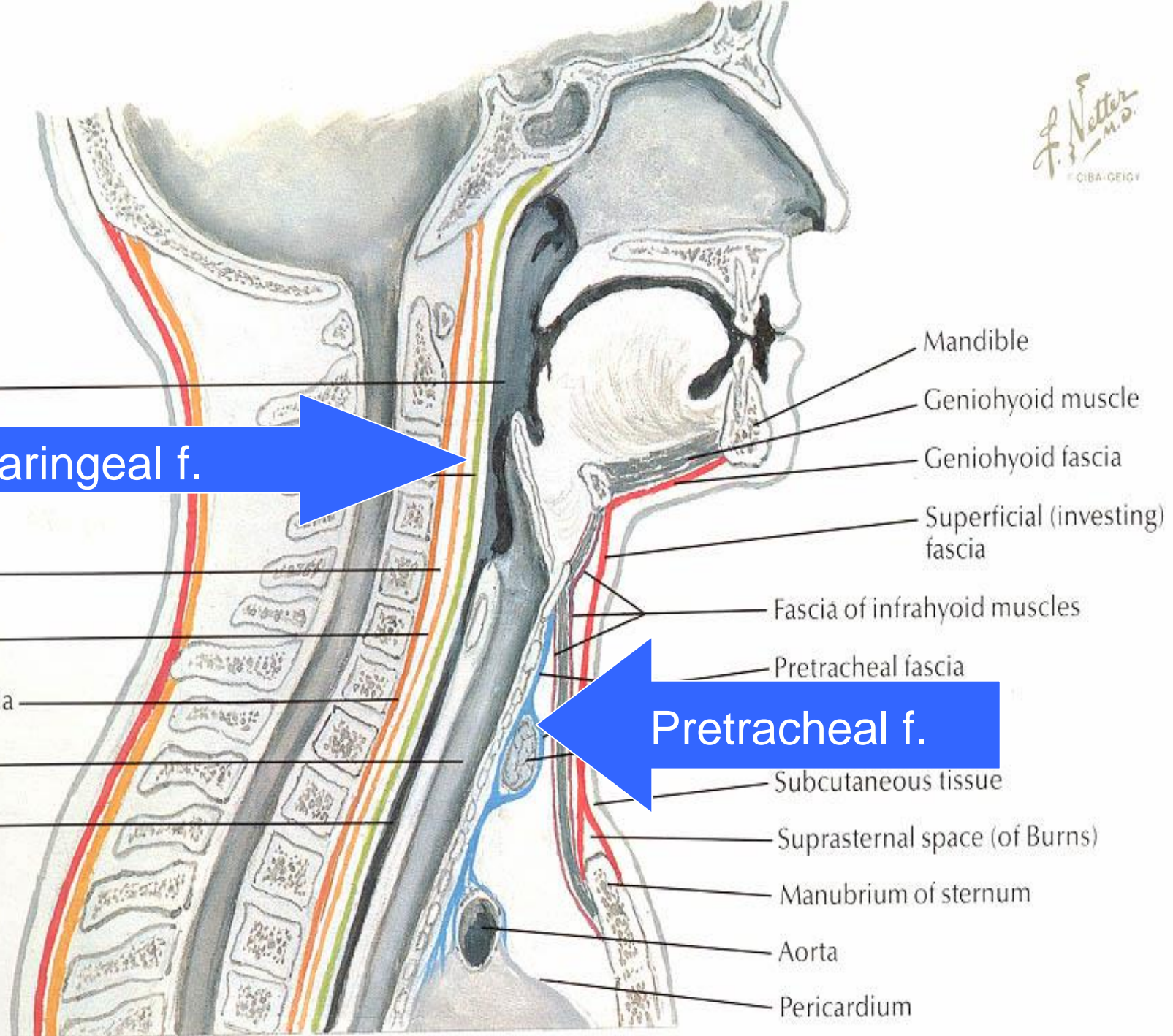
Subcutaneous tissue

Suprasternal space (of Burns)

Manubrium of sternum

Aorta

Pericardium



Interfacial spaces

Spatium interaponeuroticum suprasternale

Spatium previscerale

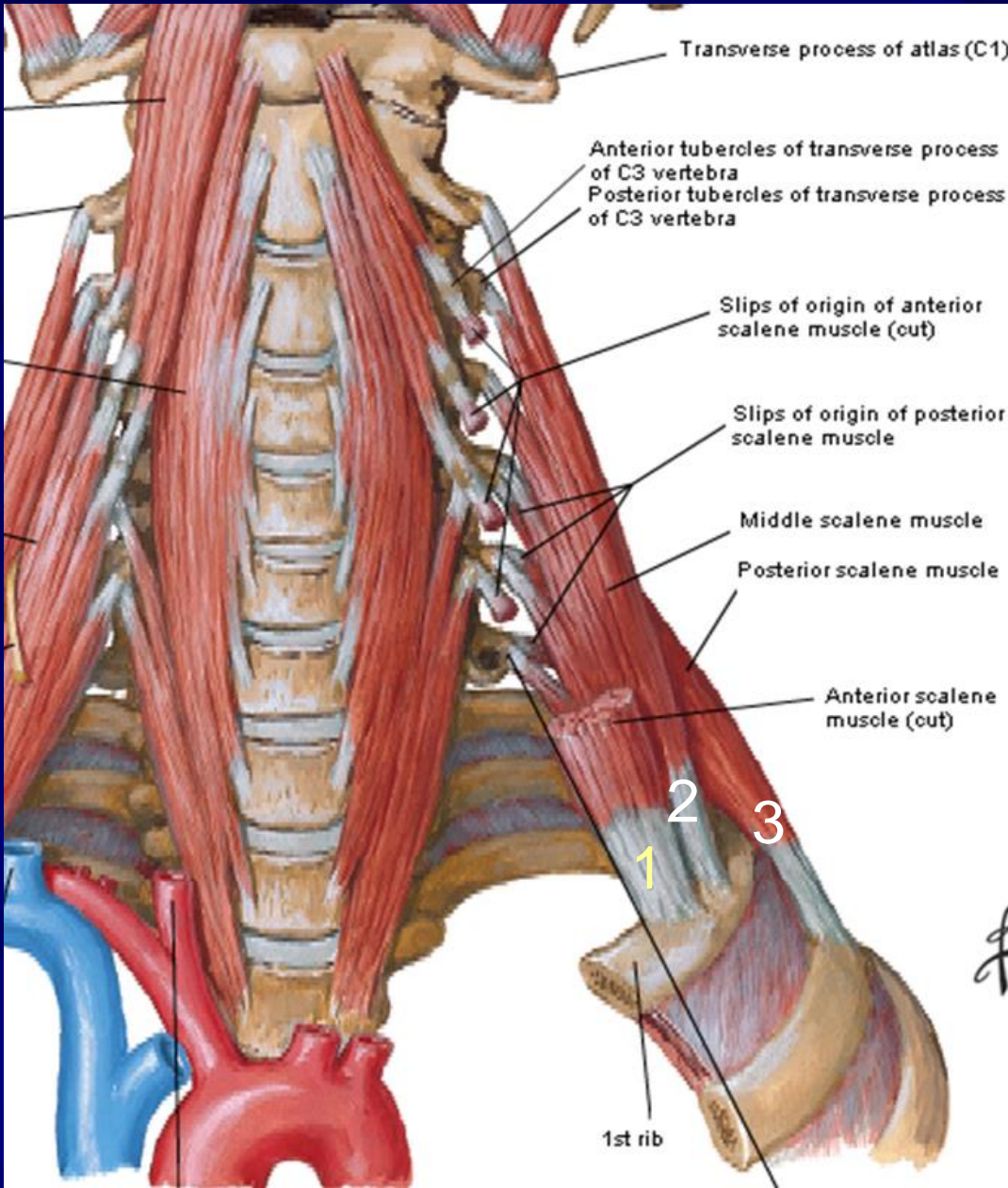
Spatium retroviscerale

Spatium prevertebrale

Spatium vasonervorum

Lateral adipose spaces

Scalene muscles



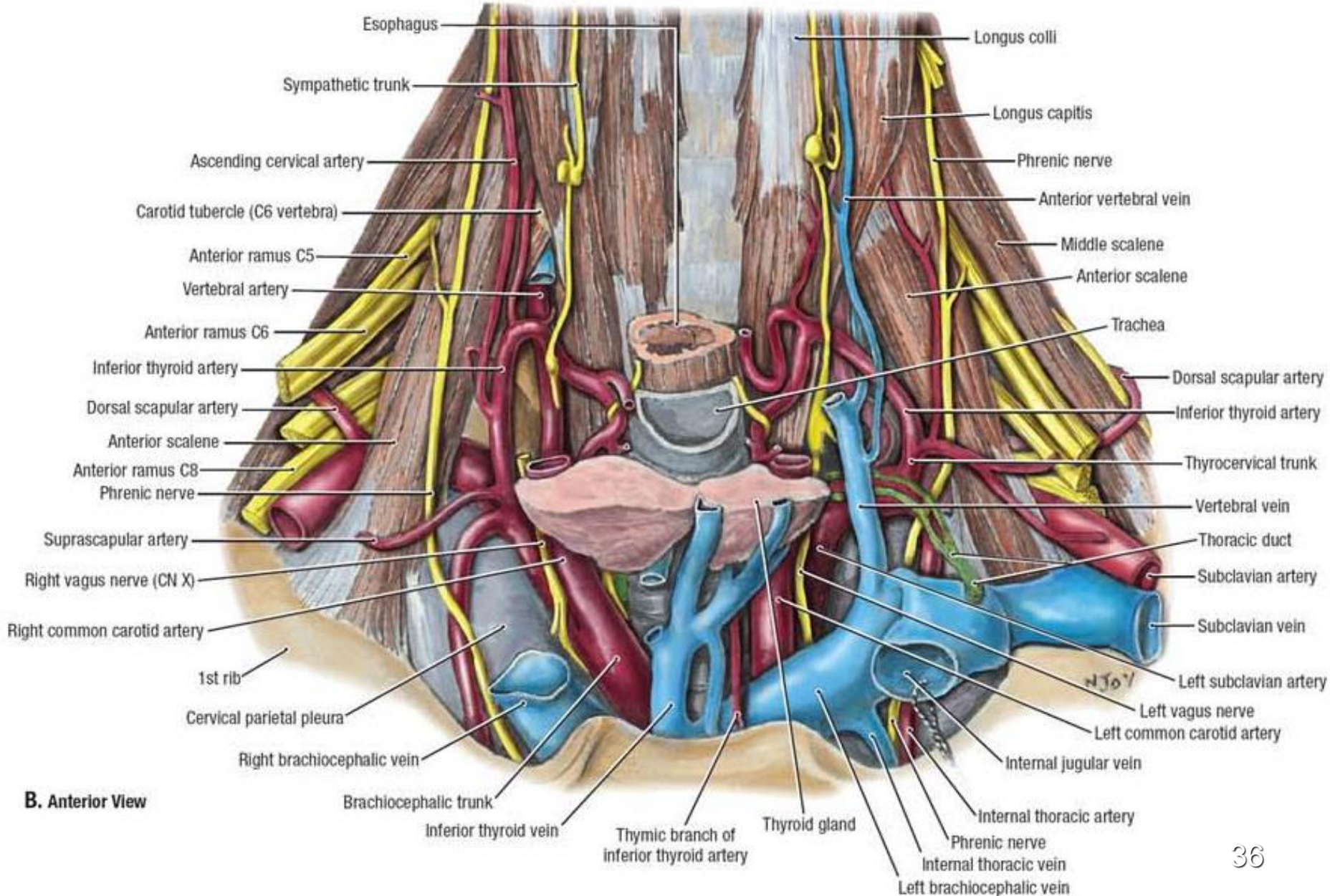
1. Anterior scalene
2. Middle scalene
3. Posterior scalene

Actions of scalenes muscles

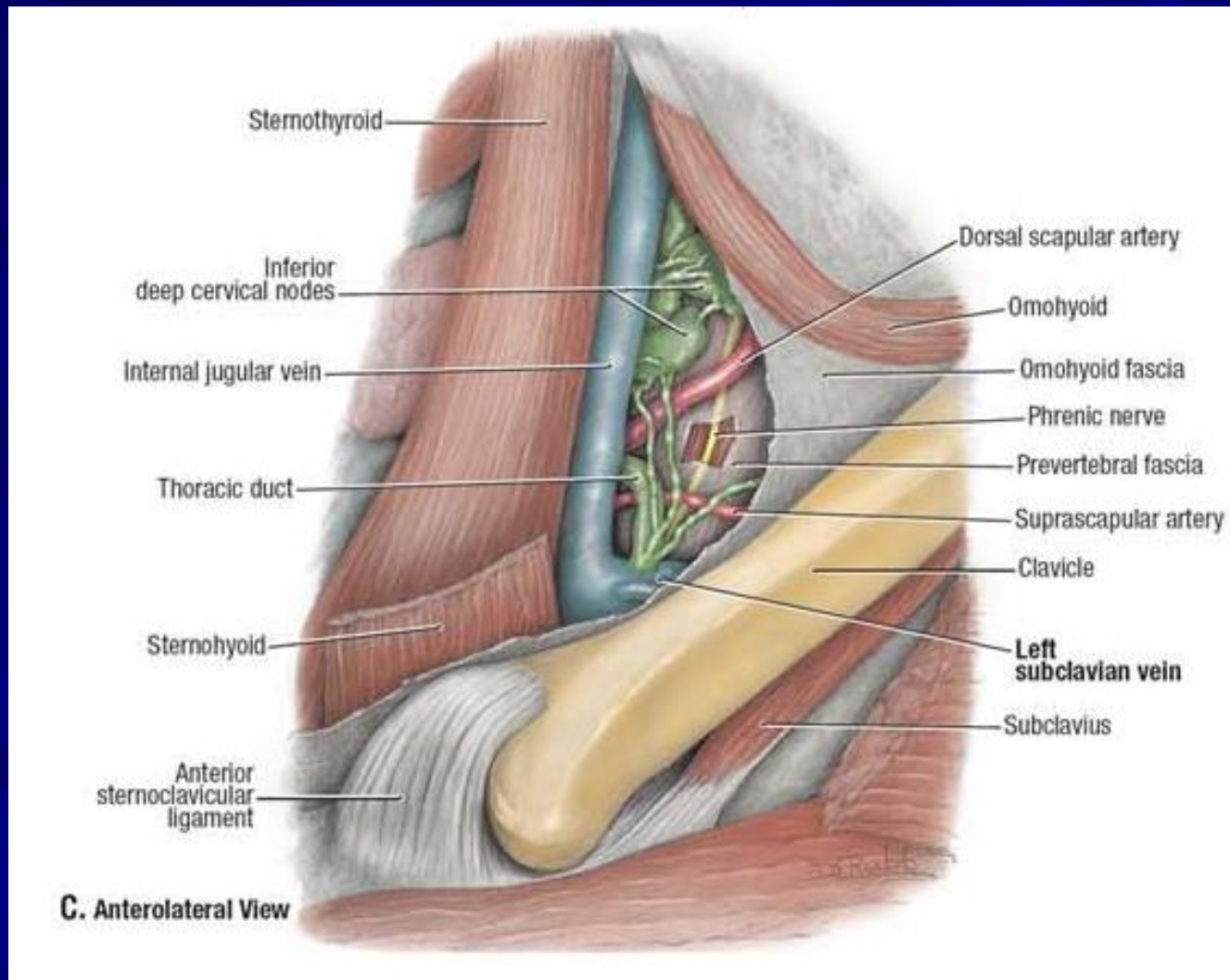
Unilaterally: Laterally flex the head and neck to the same side, rotate head and neck to the opposite side

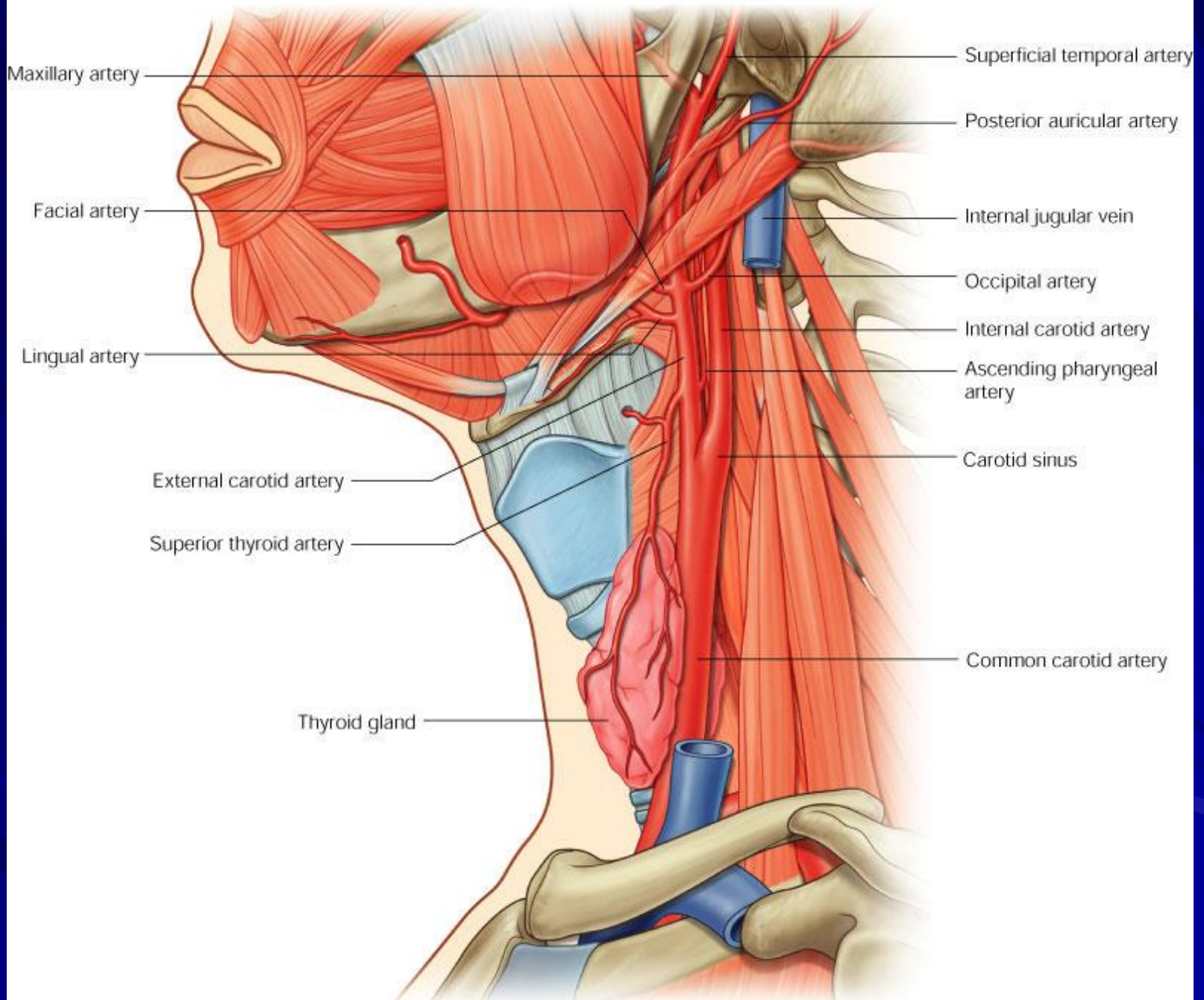
Bilaterally: Elevate the ribs during inhalation, flex the head and neck

Structures of deep neck



Inferior jugular bulb and Thoracic Duct (Pyrohov's angle)





Maxillary artery

Facial artery

Lingual artery

External carotid artery

Superior thyroid artery

Thyroid gland

Superficial temporal artery

Posterior auricular artery

Internal jugular vein

Occipital artery

Internal carotid artery

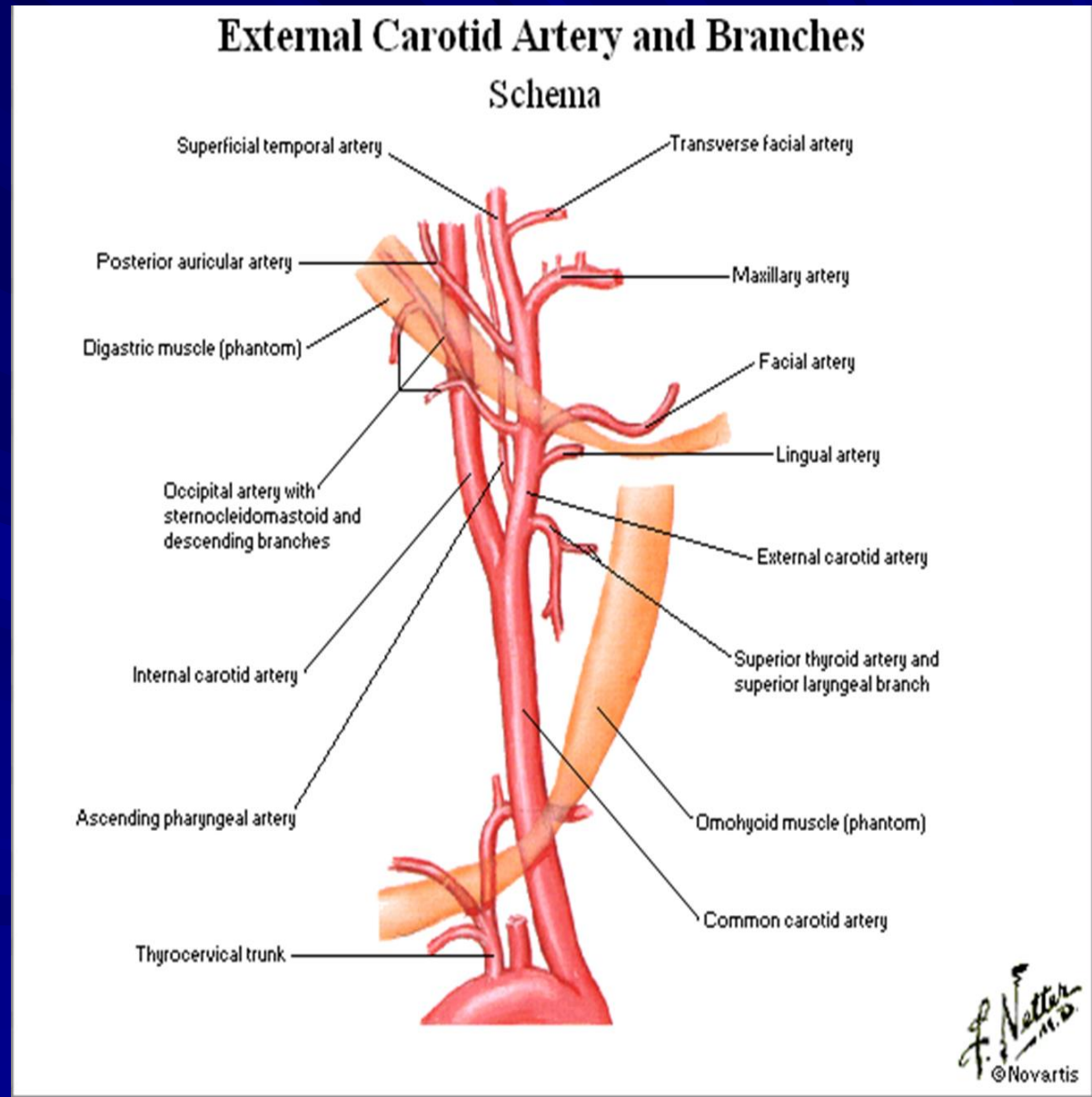
Ascending pharyngeal artery

Carotid sinus

Common carotid artery

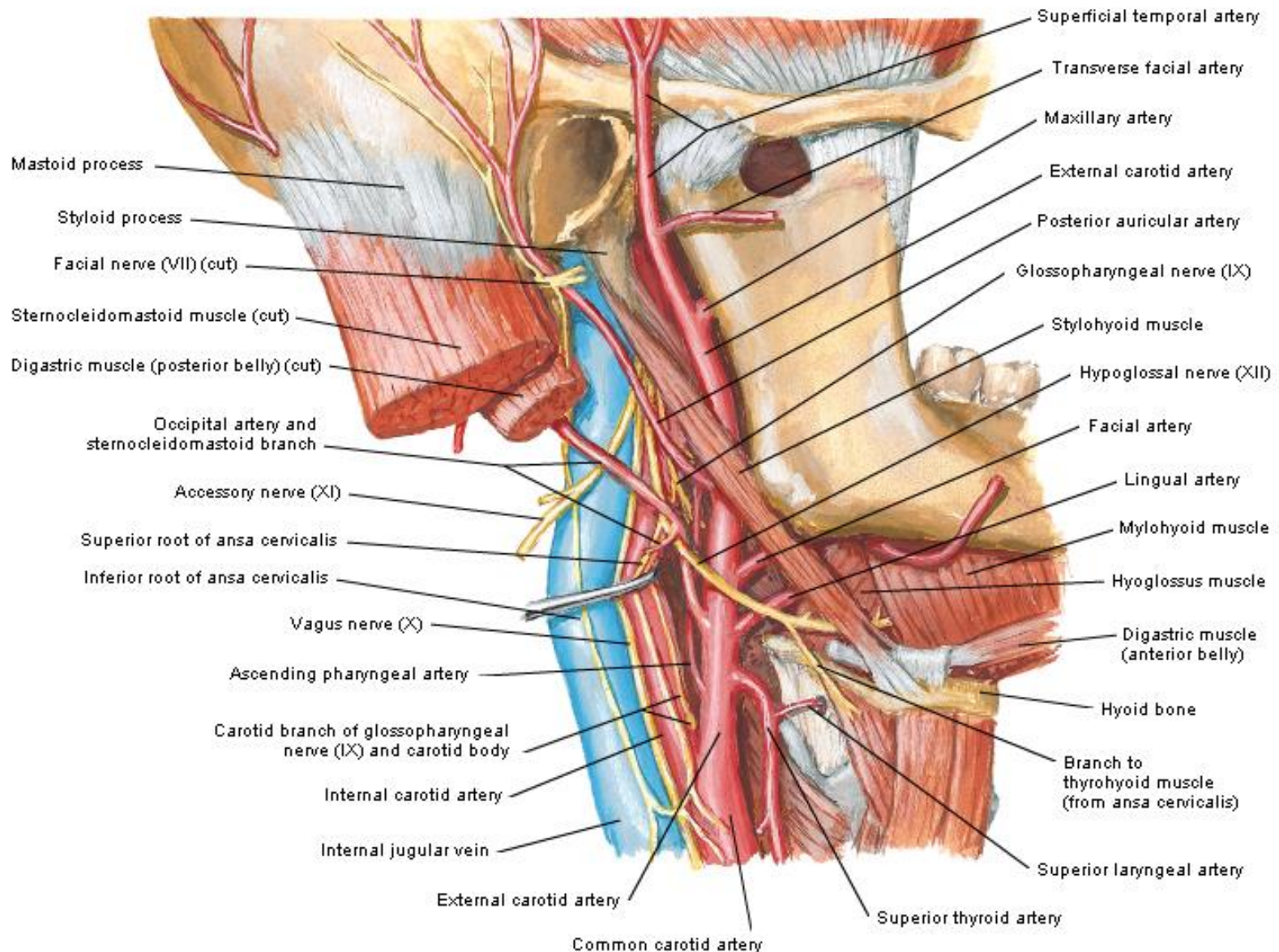
External Carotid Artery

- Anterior Branches
 - superior thyroid artery
 - lingual artery
 - facial artery
- Posterior Branches
 - occipital artery
 - posterior auricular artery
- Medial Branches
 - ascending pharyngeal artery
- Terminal Branches
 - superficial temporal artery
 - maxillary artery



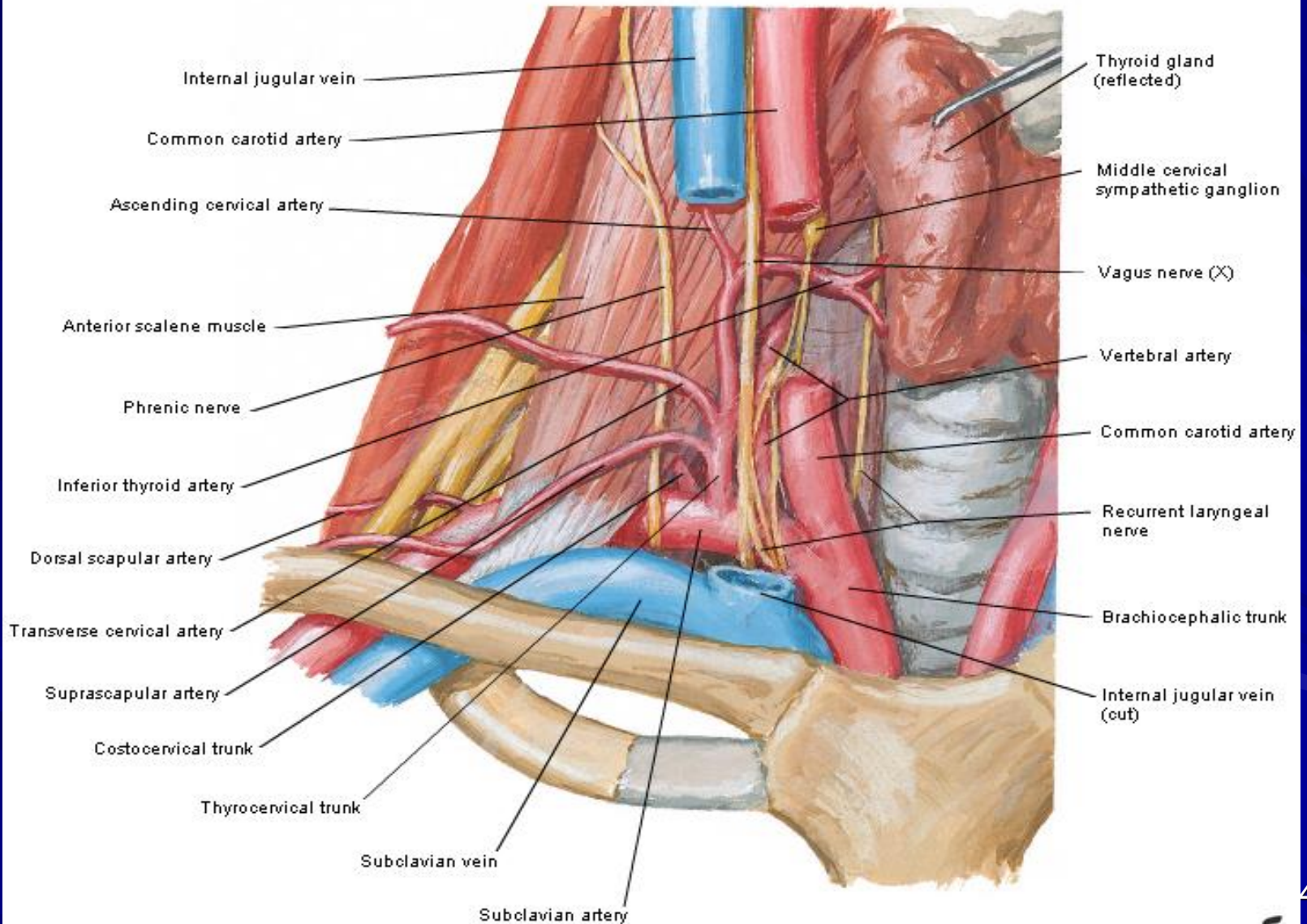
Carotid Arteries - Parotid Space (Bed)

Right Lateral Dissection



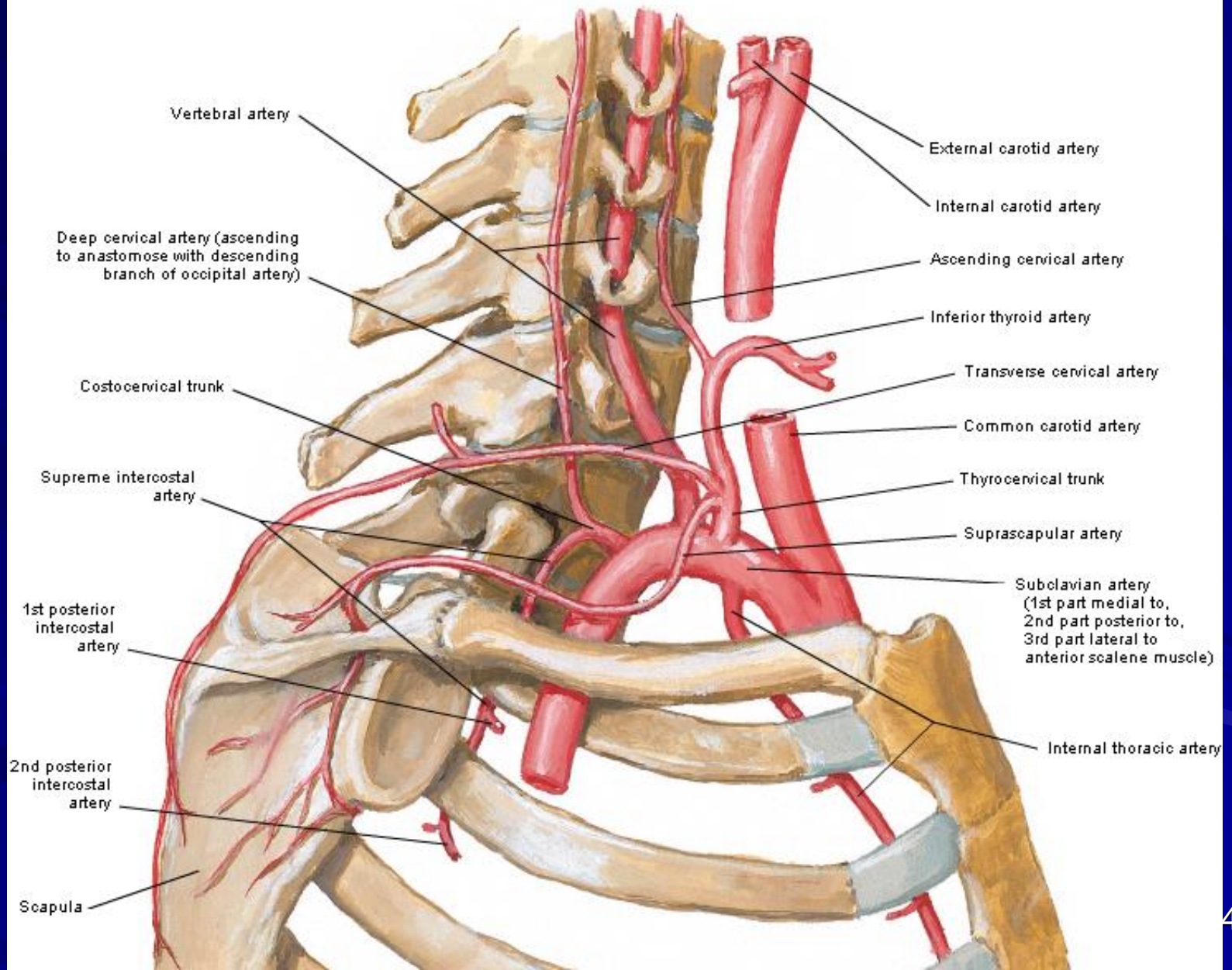
Subclavian Artery

Right Anterior Dissection



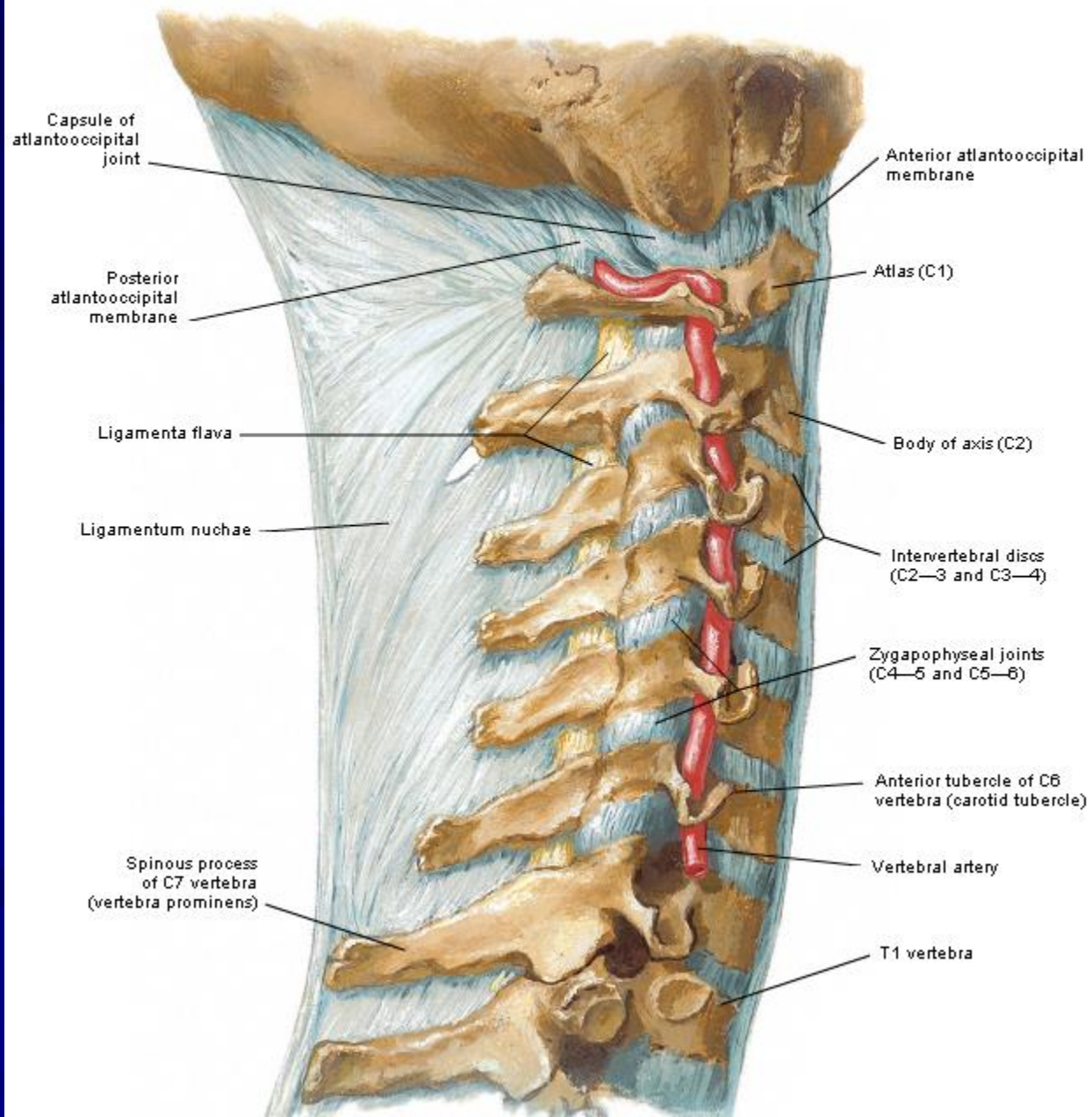
Subclavian Artery

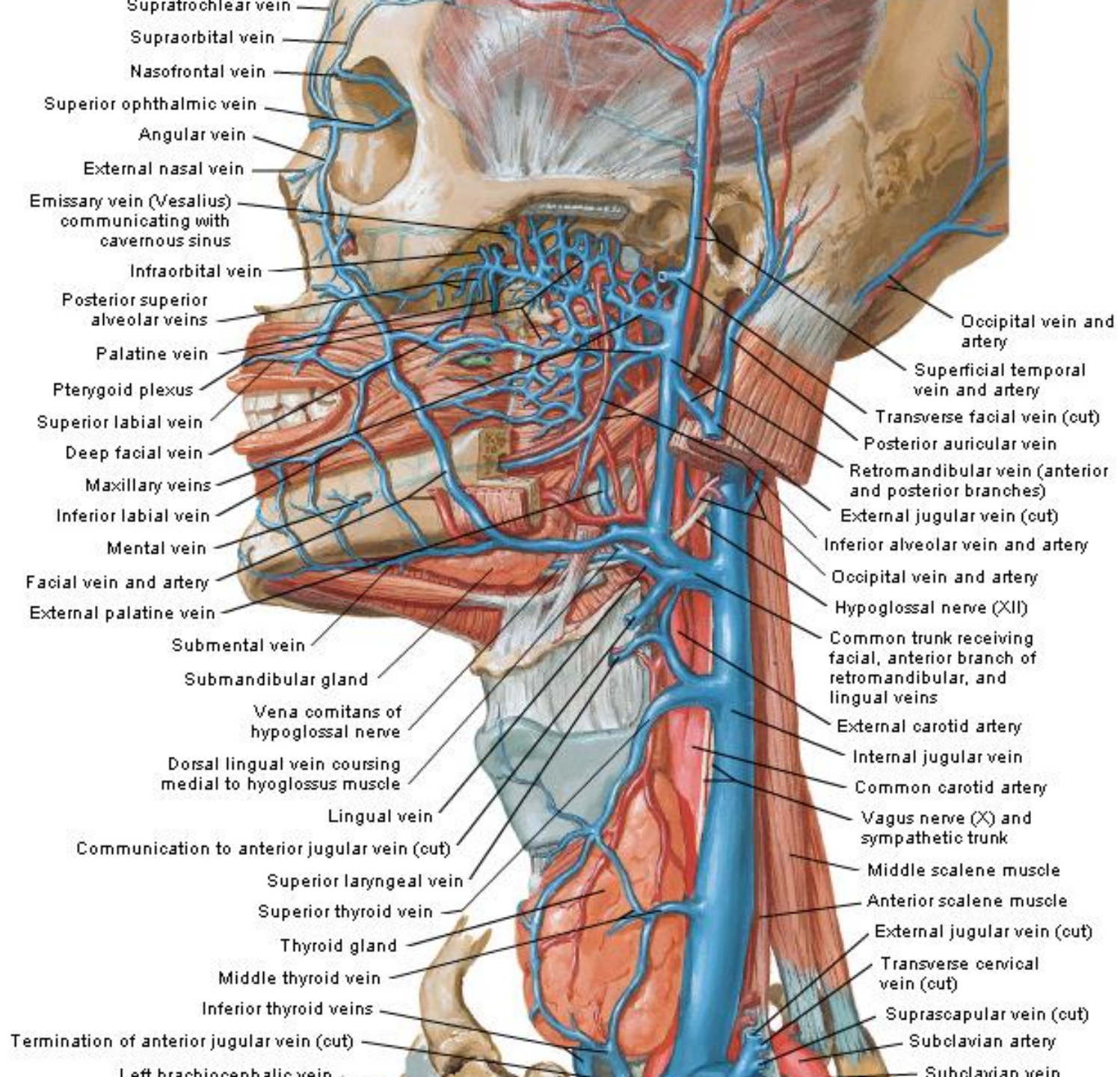
Right Lateral Schematic View



External Craniocervical Ligaments

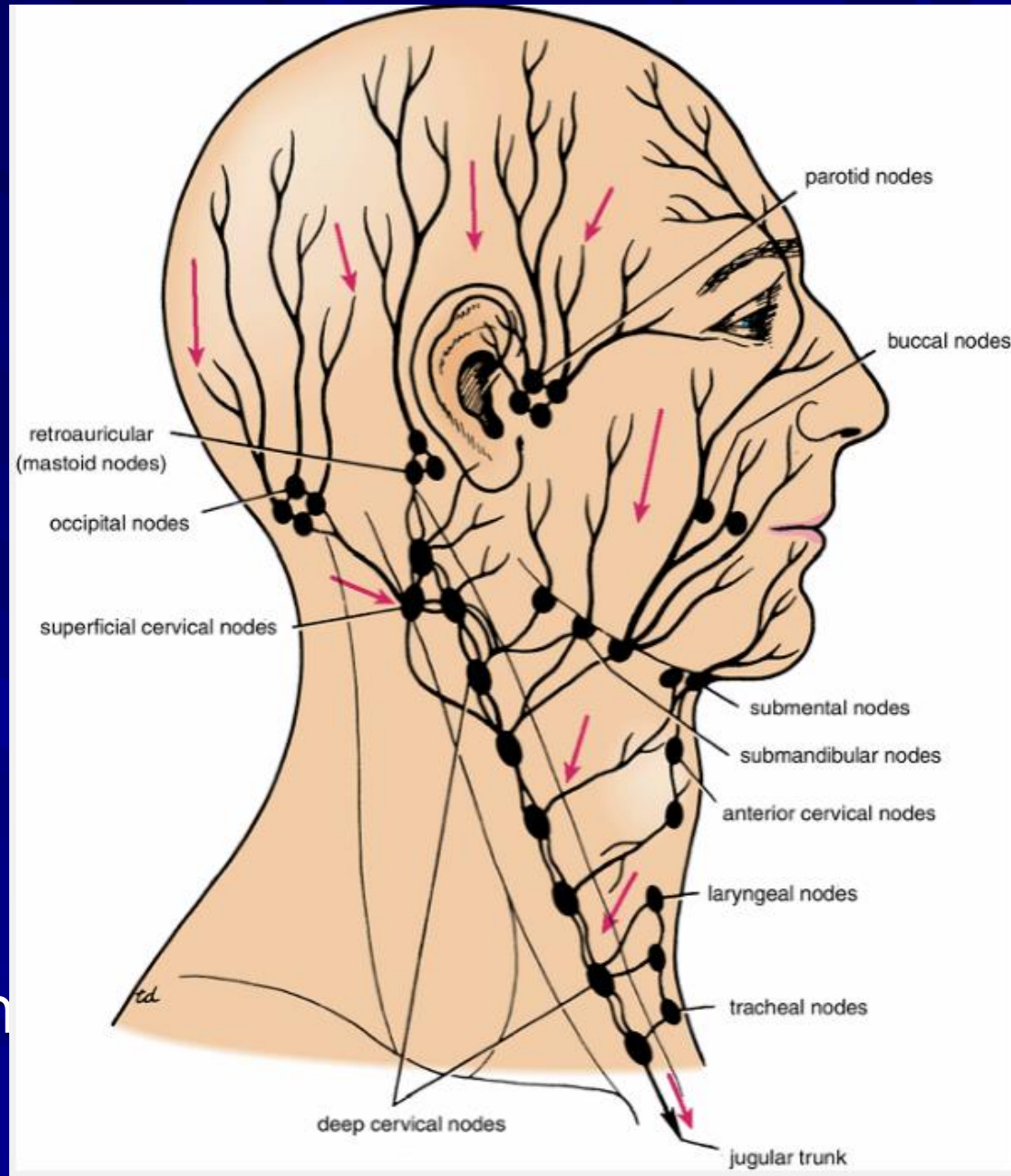
Right Lateral View



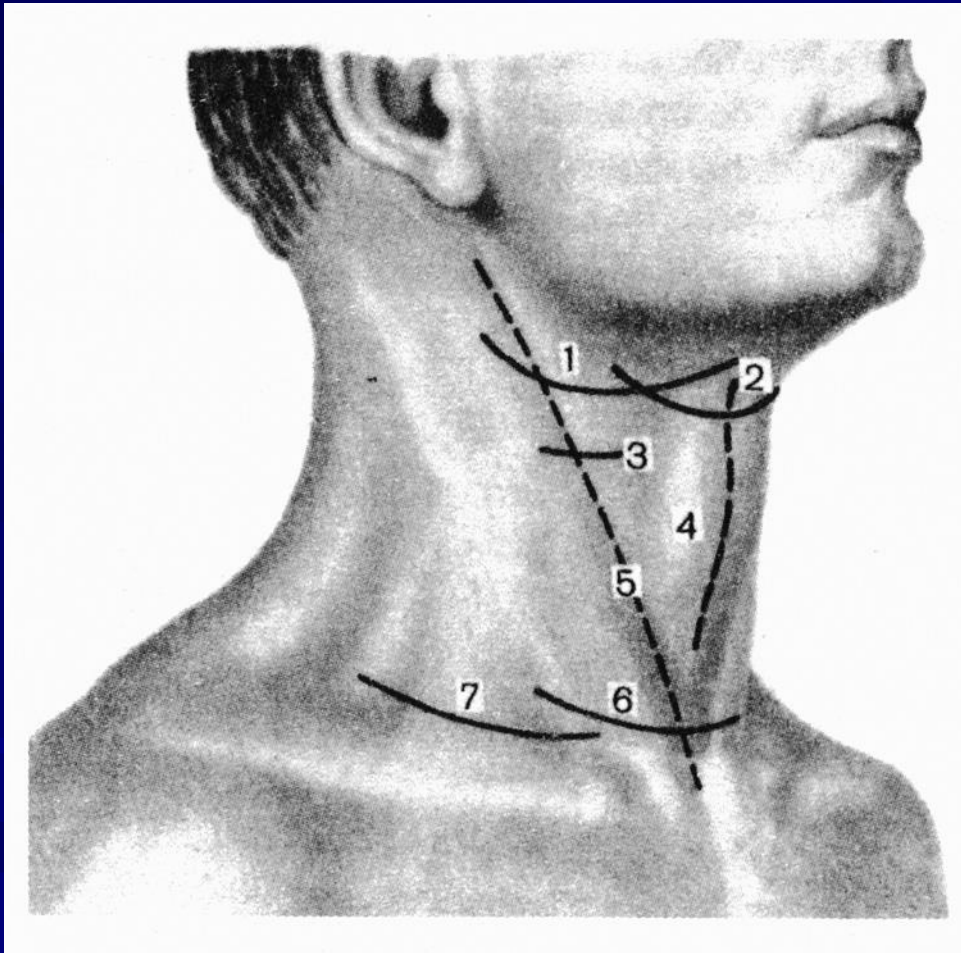


Cervical Lymph Nodes

1. Preauricular
2. Postauricular
3. Occipital
4. Submental
5. Submandibular
6. Jugulodigastric
7. Superficial cervical
8. Posterior cervical
9. Deep cervical chain
10. Supraclavicular



Main surgical accesses to organs of the Neck:



- 1 – oblique;
- 2 – vertical;
- 3 – transversal;
- 4 – combined.

Combined incisions



Y Incision



McFee Incision

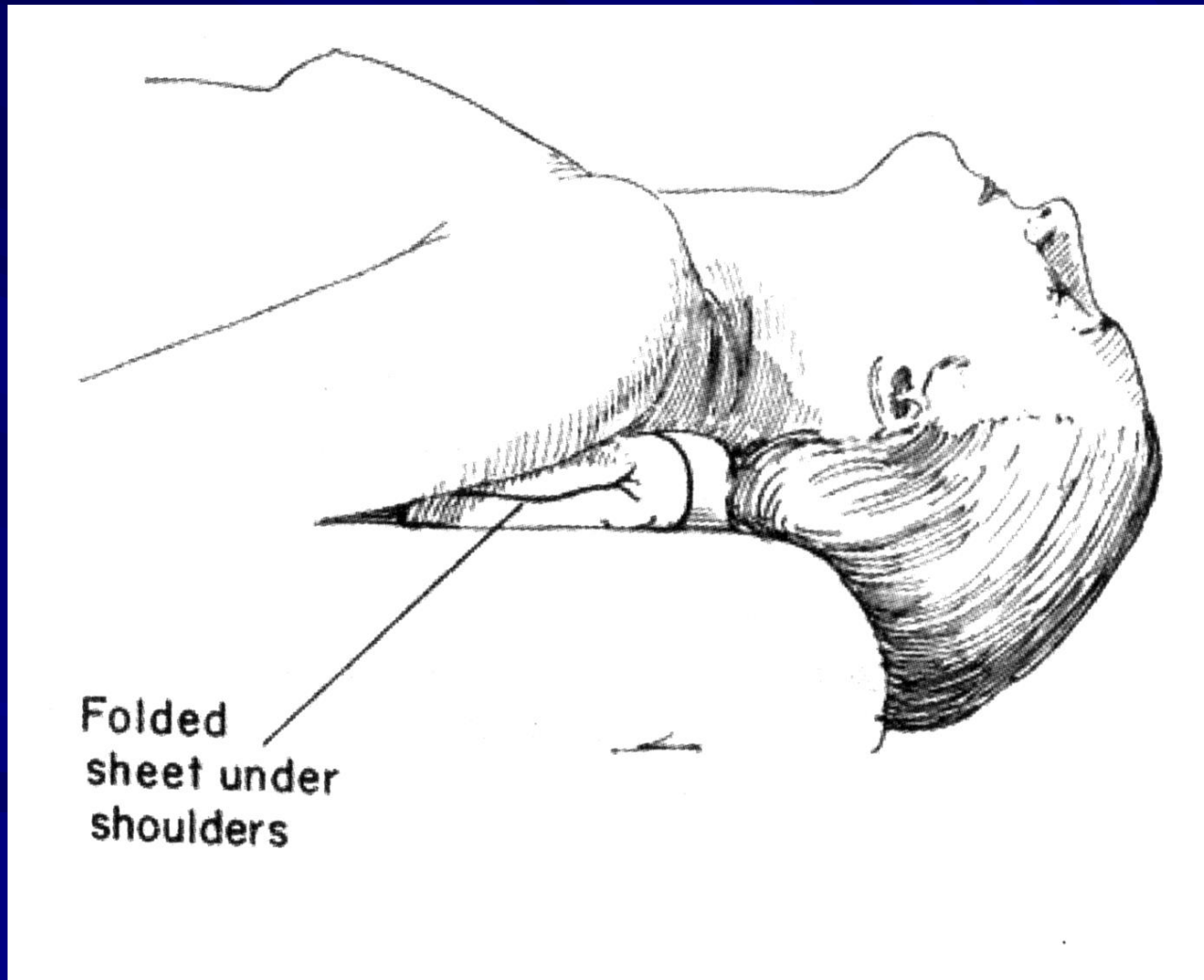


H Incision

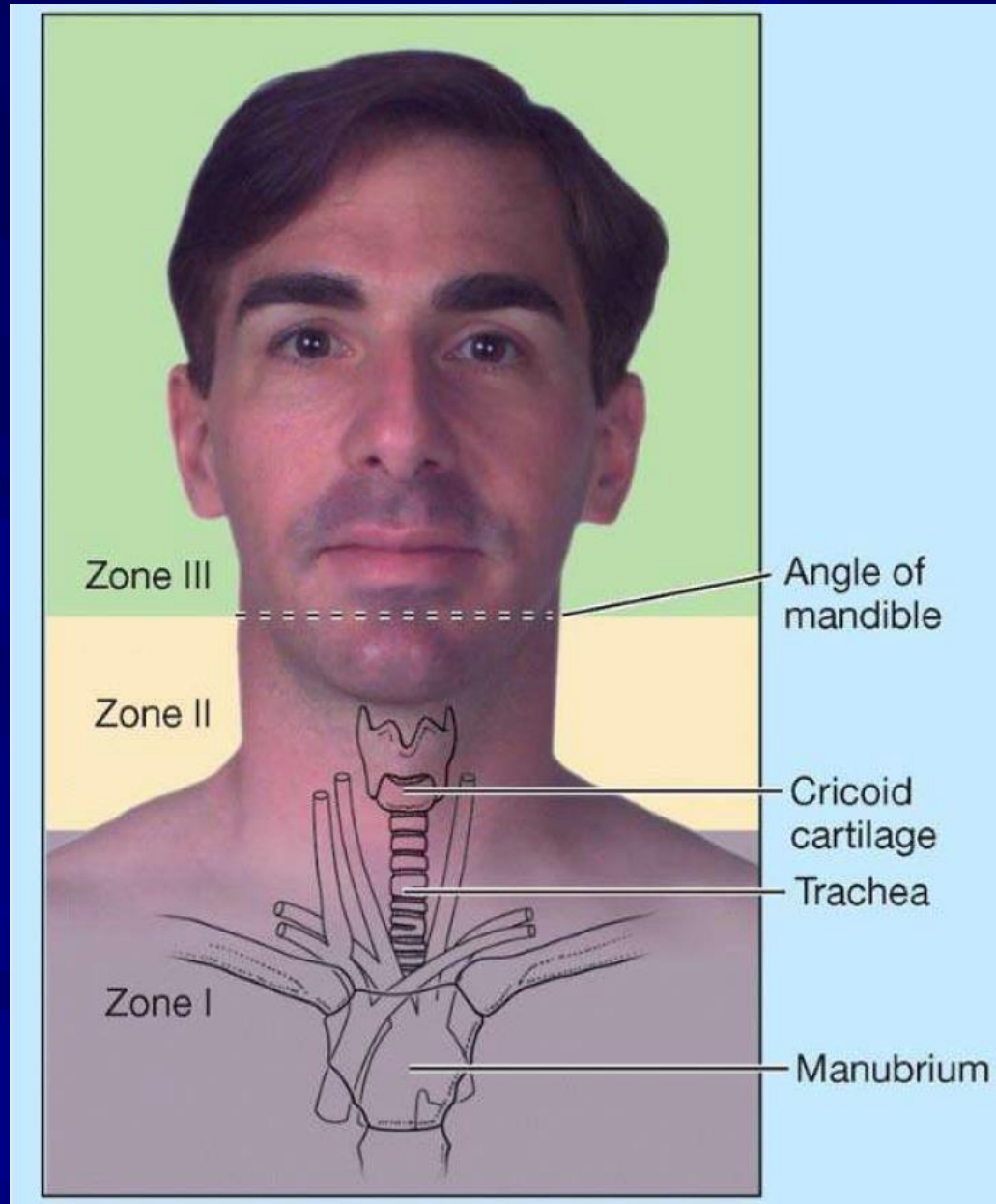


J Incision

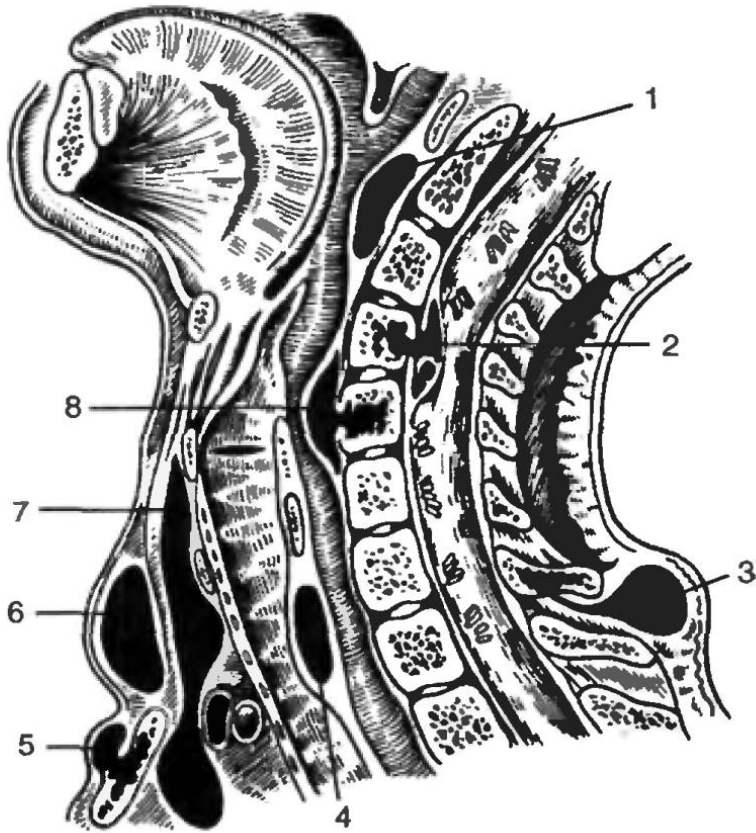
Position of the patient at operations on the neck



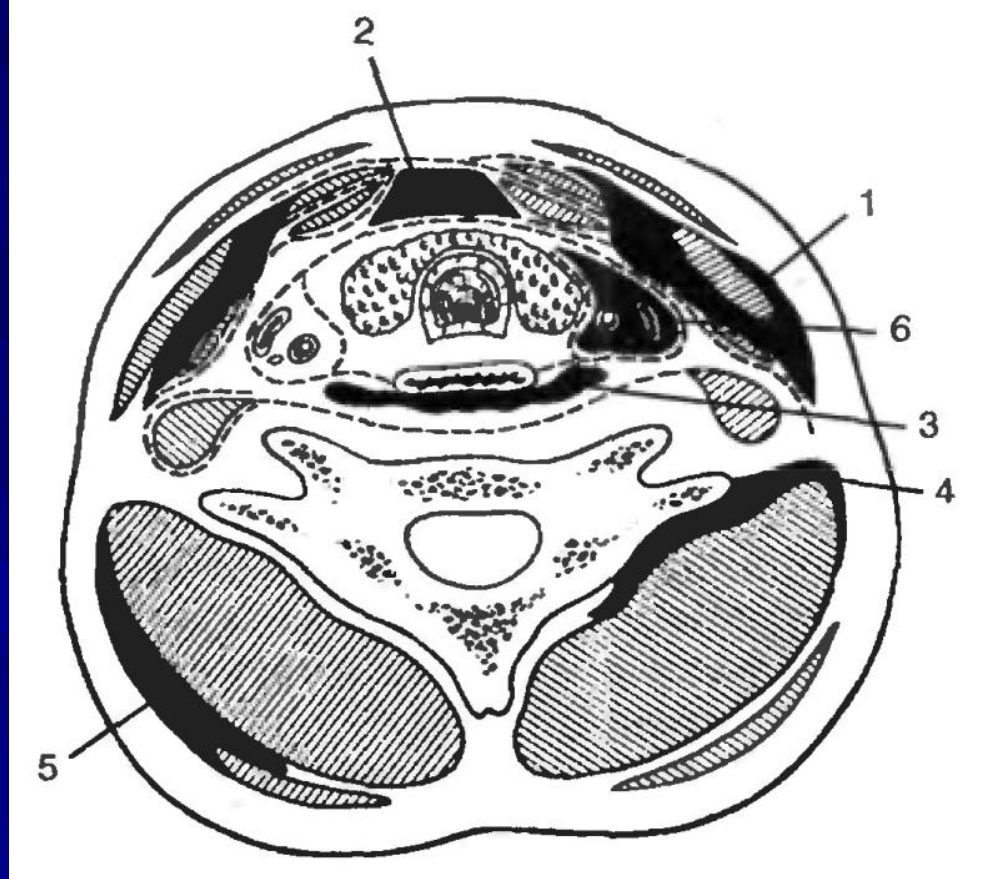
Zones of Penetrating Trauma



Typical localization of phlegmons and abscesses of the Neck



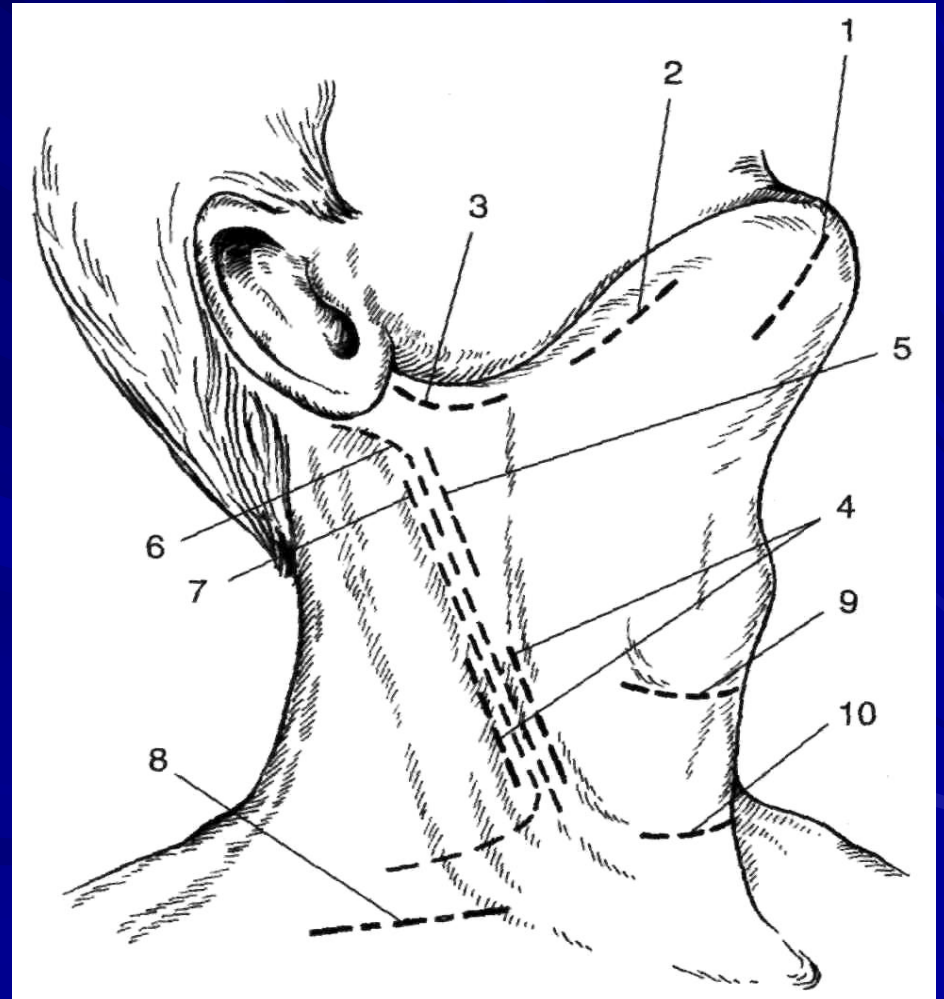
Sagittal section: 1 – retropharyngeal abscess; 2 – epidural abscess; 3 – nuchean region phlegmon; 4 – retotracheal abscess; 5 – presteral abscess; 6 – intraaponeurotic suprasternal abscess; 7 – abscess in the prevertebral space; 8 – retroesophageal abscess



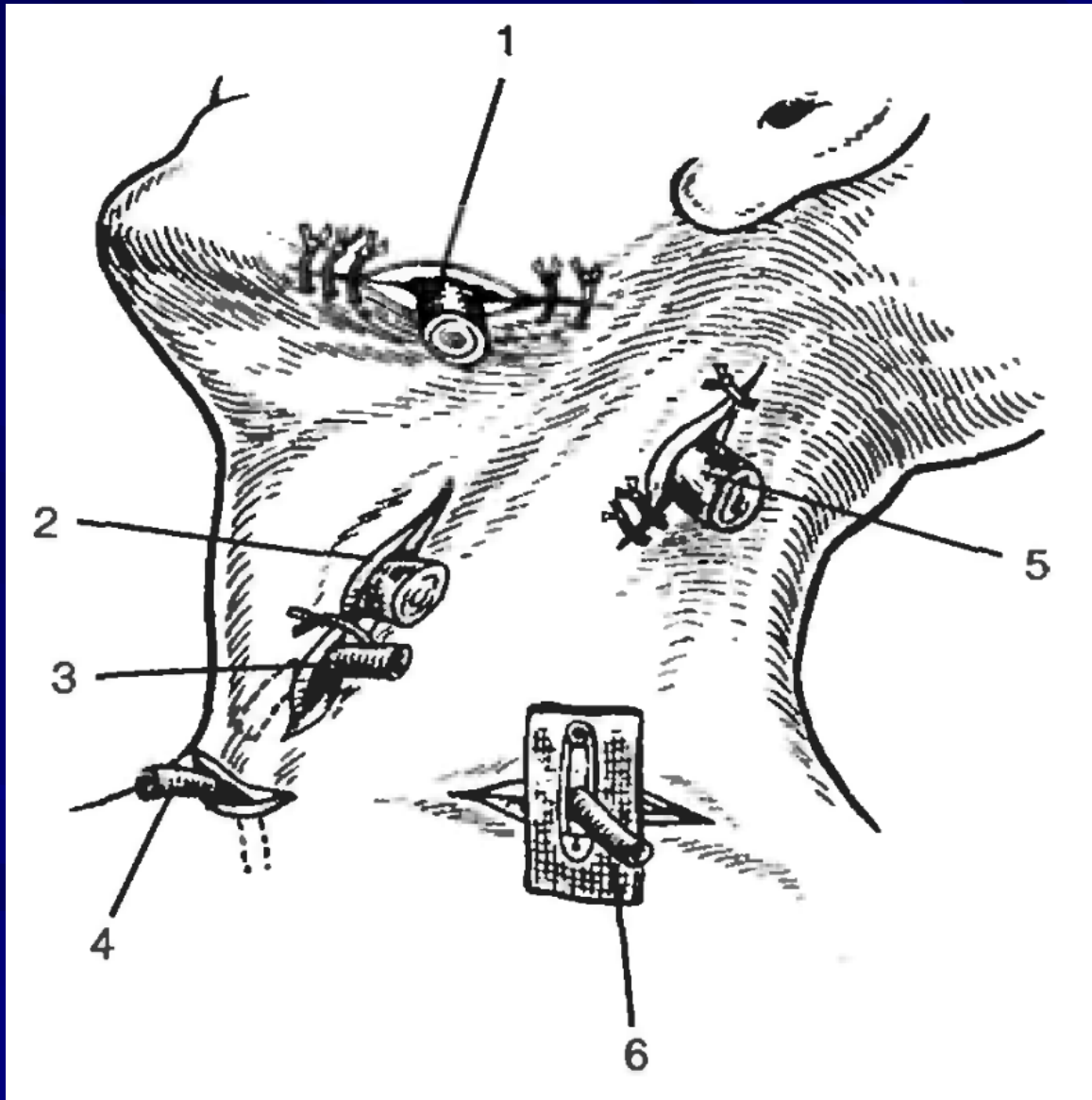
Horizontal section: 1 – phlegmon around SCM muscle; 2 – abscess in the prevertebral space; 3 – retroesophageal abscess; 4 – deep posterior phlegmon of neck; 5 – infratrapezoid phlegmin; 6 – cervical neurovascular bundle phlegmon

Typical accesses to the opening of abscesses and phlegmon of the neck

- 1 - submental abscess,
- 2 - submandibular abscess,
- 3 - peripharyngeal abscess,
- 4, 5 –phlegmon of vascular sheath
- 6 - Kyutner's section,
- 7 - Kerven's section,
- 8 - phlegmon of the lateral neck triangle,
- 9 - pretracheal abscess and purulent strumitis,
- 10 - suprasternal interapouneurotological abscess.

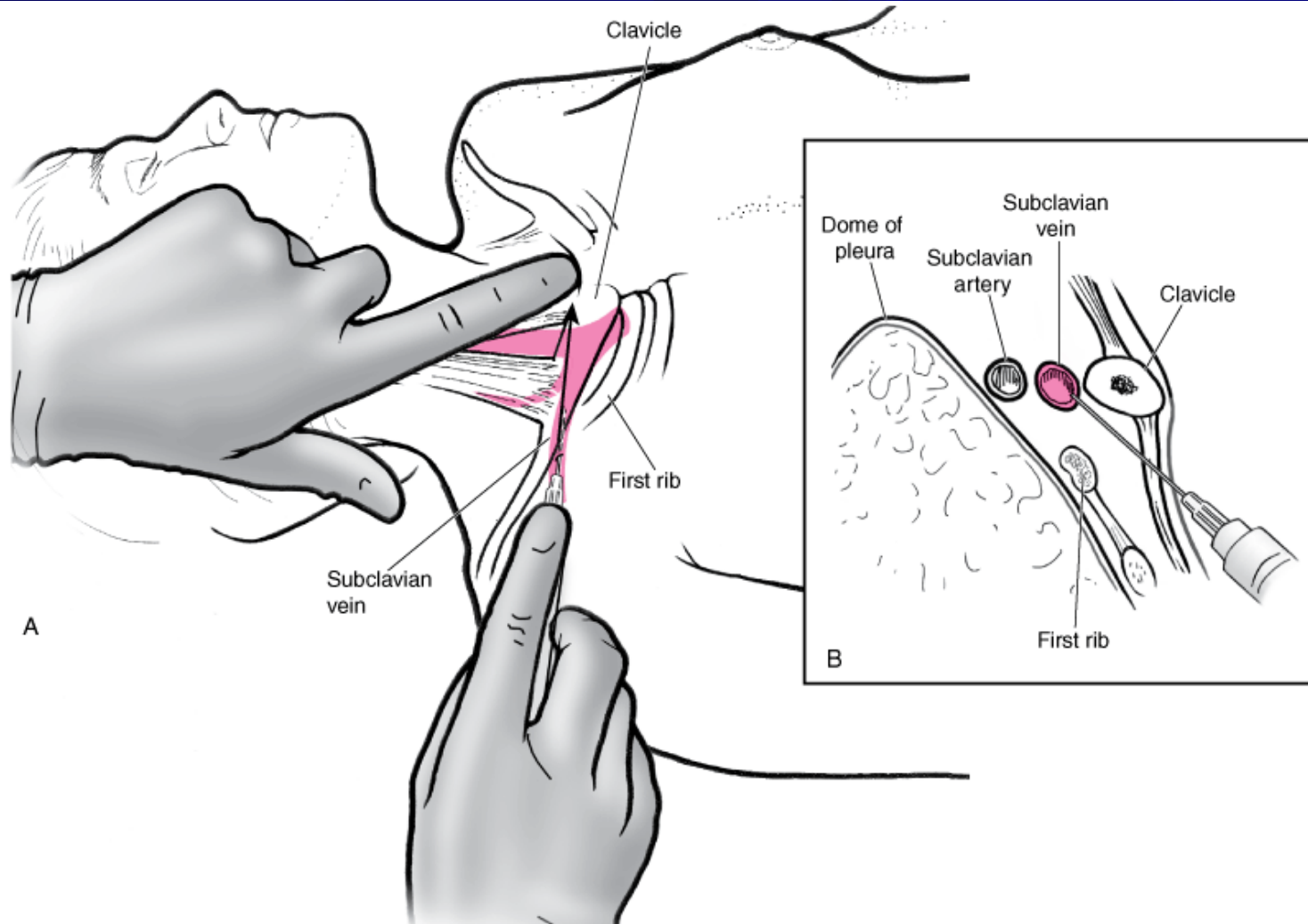


Drainage scheme of cervical phlegmons and abscesses



- 1 – submandibular phlegmon;
- 2 – neurovascular bundle phlegmon;
- 3 – pretracheal phlegmon;
- 4 – anterior mediastinum abscess;
- 5 – abscess around SCM muscle;
- 6 – phlegmon of lateral triangle

Infraclavicular Approach to the Subclavian Vein

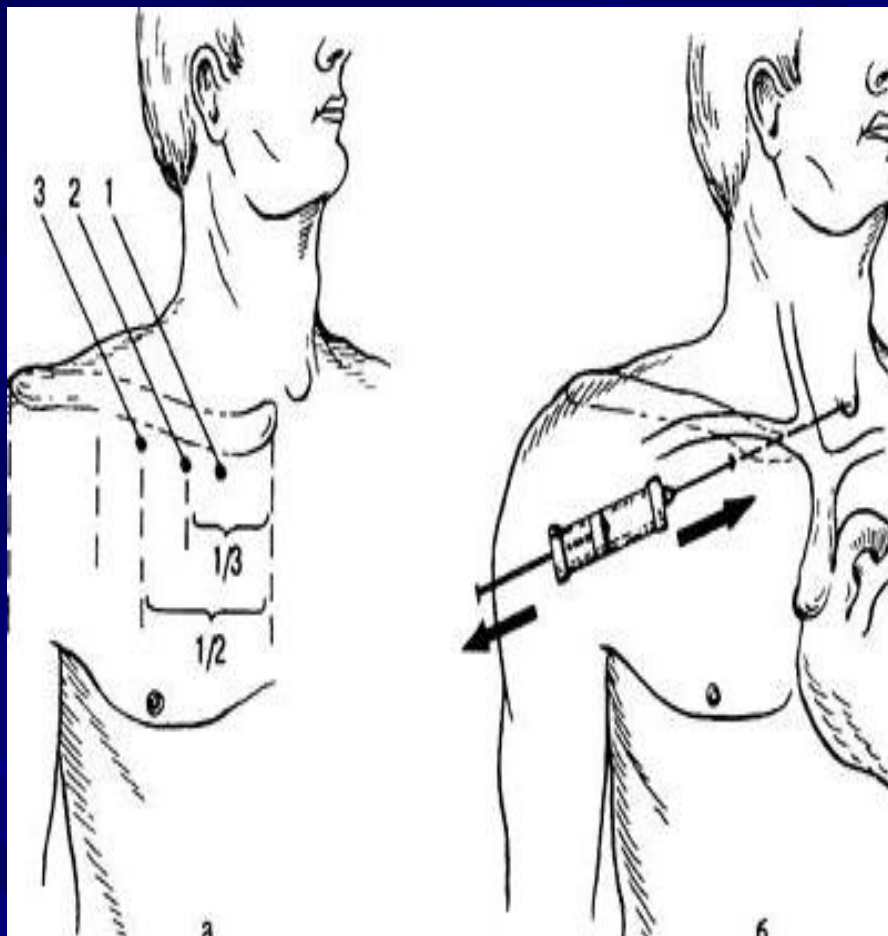


Source: Reichman EF, Simon RR: *Emergency Medicine Procedures*:
<http://www.accessemergencymedicine.com>.

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Infraclavicular approach to subclavian vein cannulation. A. Frontal (oblique) view of the procedure. B. Sagittal section through the medial third of the clavicle. Note the proximity of the pleura and subclavian artery.

Infraclavicular catheterization of subclavian vein



Points of needle insertion: 1 – by Jillies; 2 – by Obanjak; 3 – by Willson

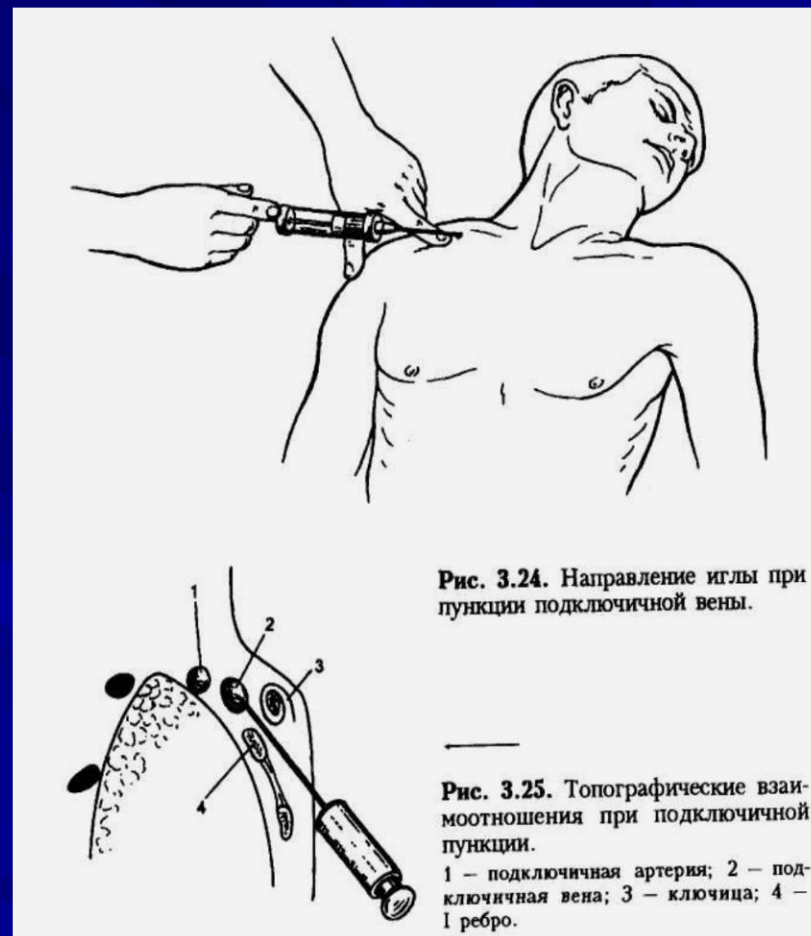
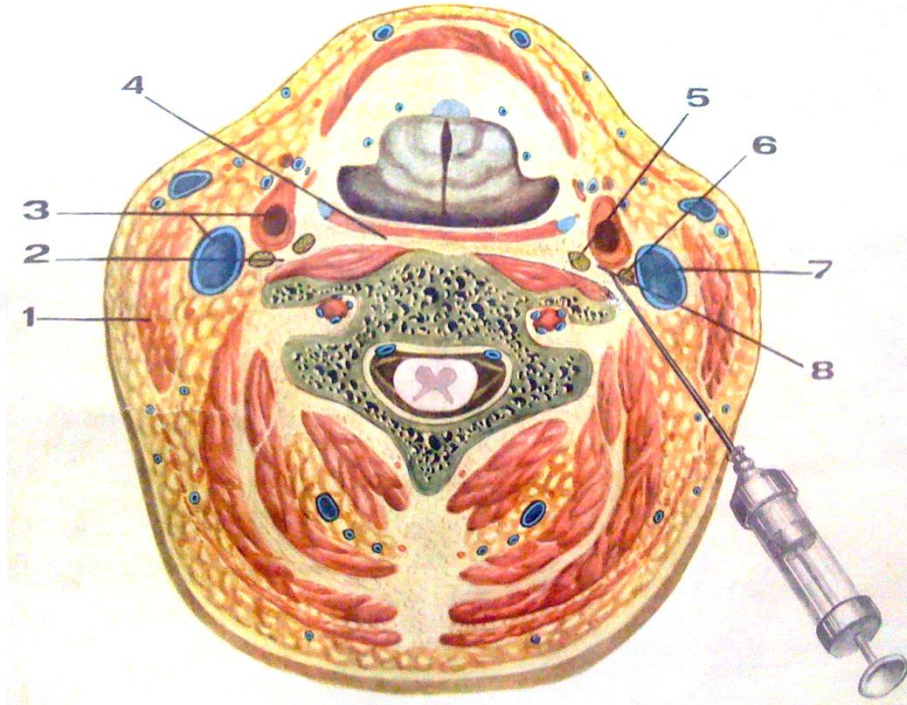


Рис. 3.24. Направление иглы при пункции подключичной вены.

Рис. 3.25. Топографические взаимоотношения при подключичной пункции.
1 – подключичная артерия; 2 – подключичная вена; 3 – ключица; 4 – I ребро.

Direction of the needle during puncture

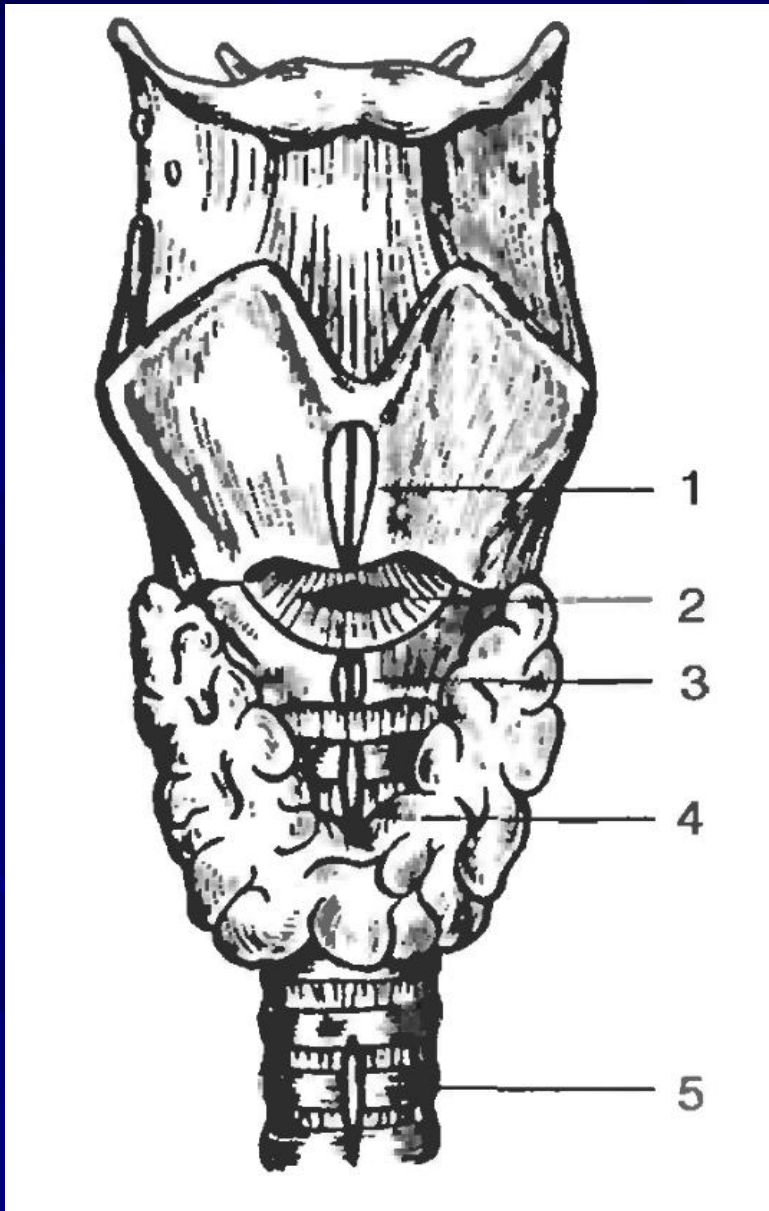
VISHNEVSKY'S VAGOSYMPATHETIC NOVOCAIN BLOCKADE



1 – sternocleidomastoid muscle
2 – prevertebral sheet of cervical fascia
3 – common carotid artery, internal jugular vein
4 – visceral sheet of endocervical fascia

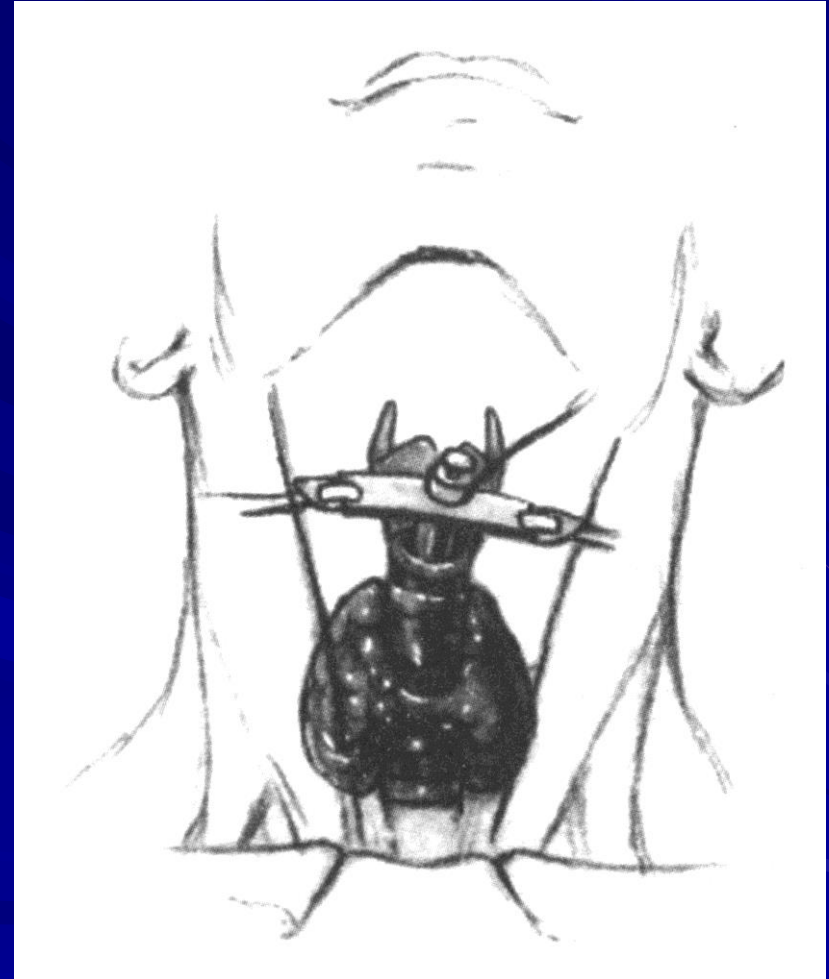
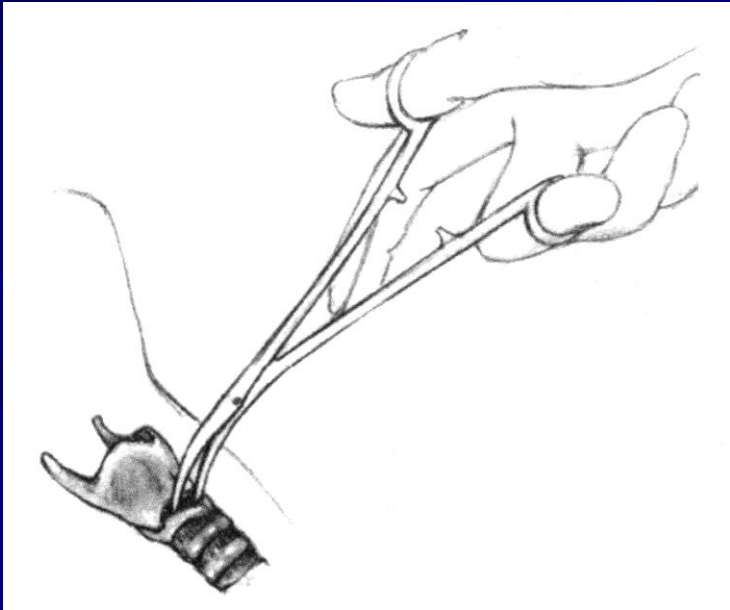
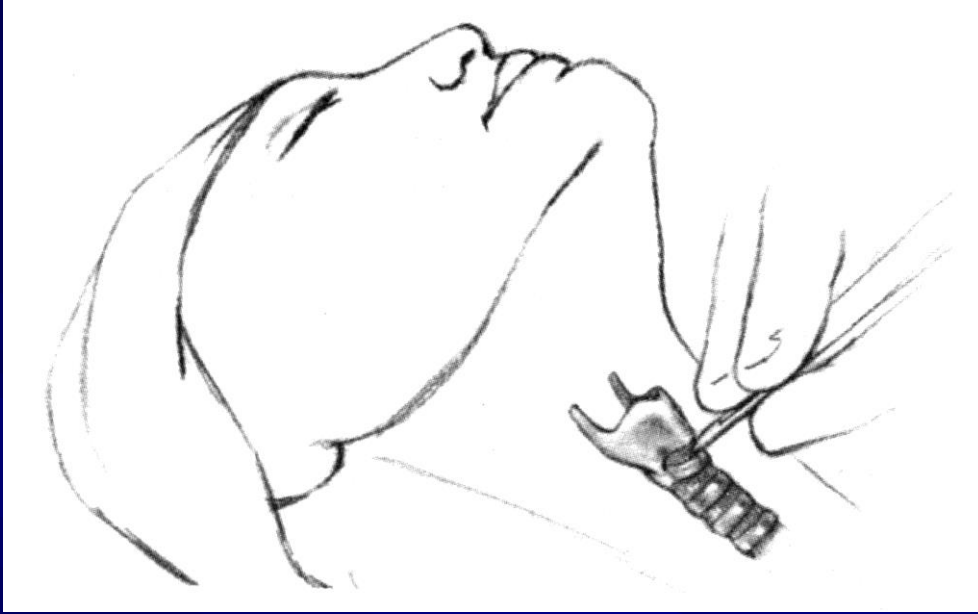
5 – sympatic trunk
6 – n. vagus
7 – main cervical neurovascular bundle
8 – retrovisceral interfascial cervical space (place for Novocaine injection)

Incisions of the high breathe ways



- 1 – thyreotomy;
- 2 – conicotomy;
- 3 – cricotomy;
- 4 – superior tracheotomy;
- 5 – inferior tracheotomy

LARYNGOTOMY



LARYNGOTOMY

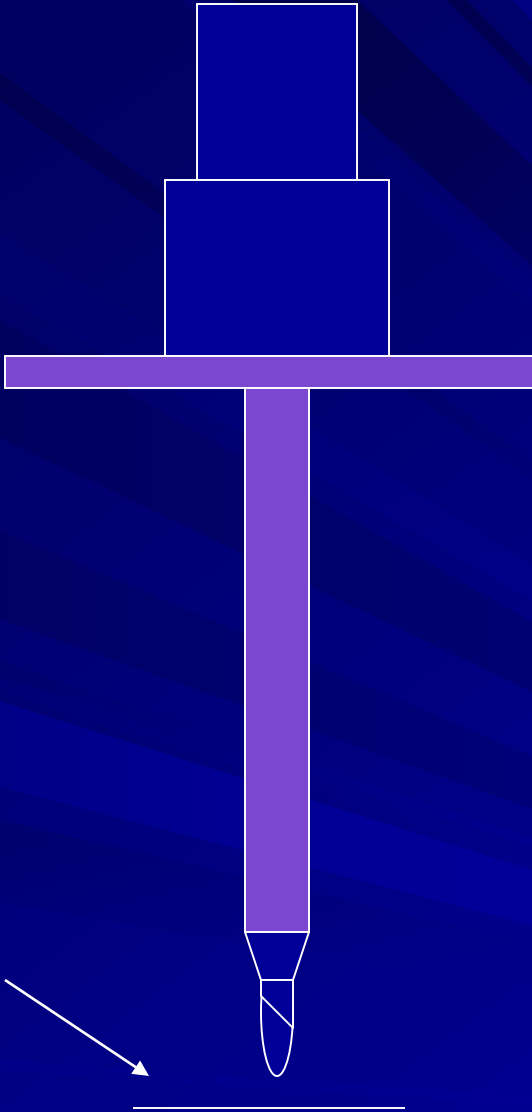


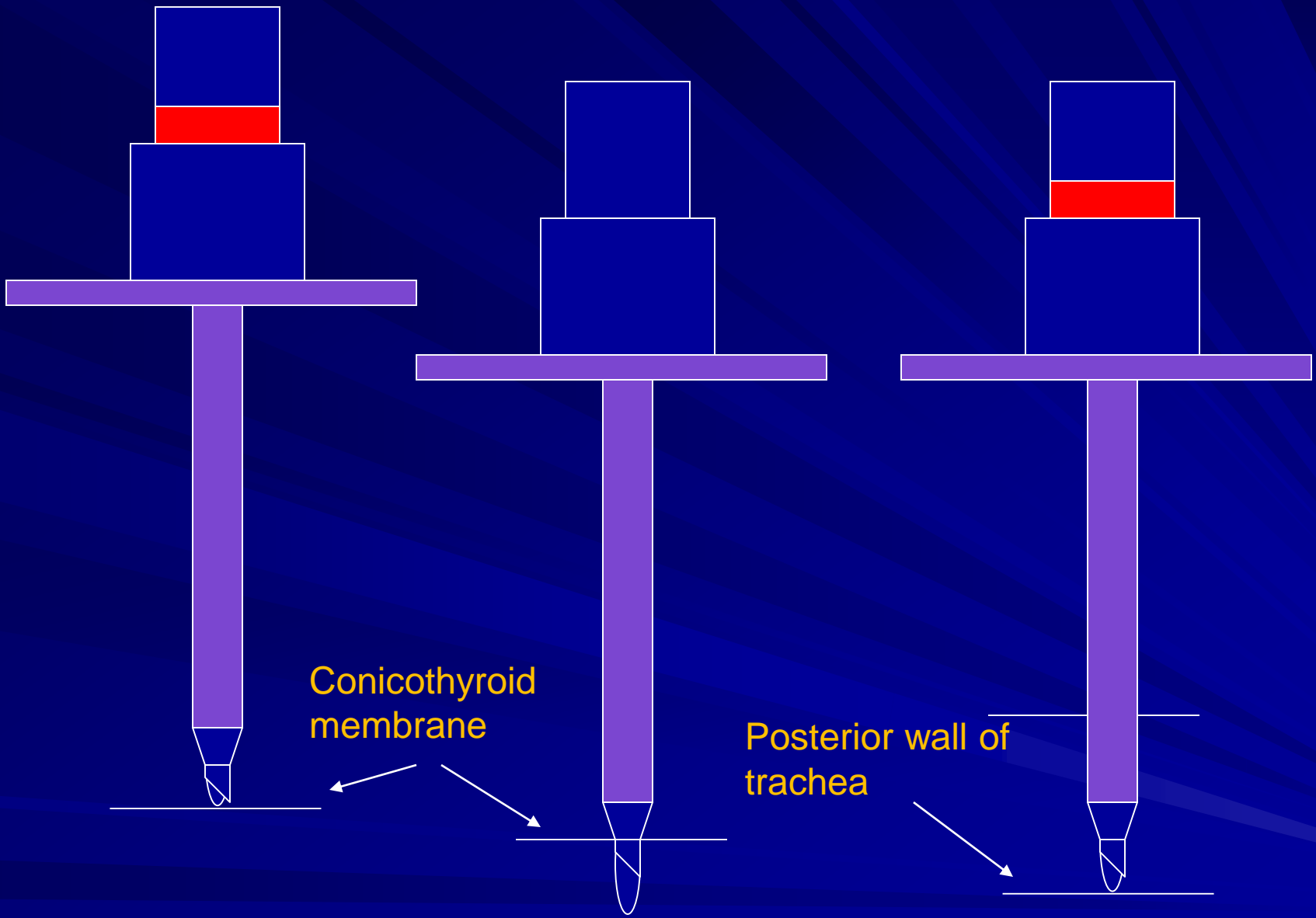
INSTRUMENTS:

- Scalpel
- Tube for tracheostomy
- Syringe 10 ml
- Suture material
- Fix rope
- Thermovent

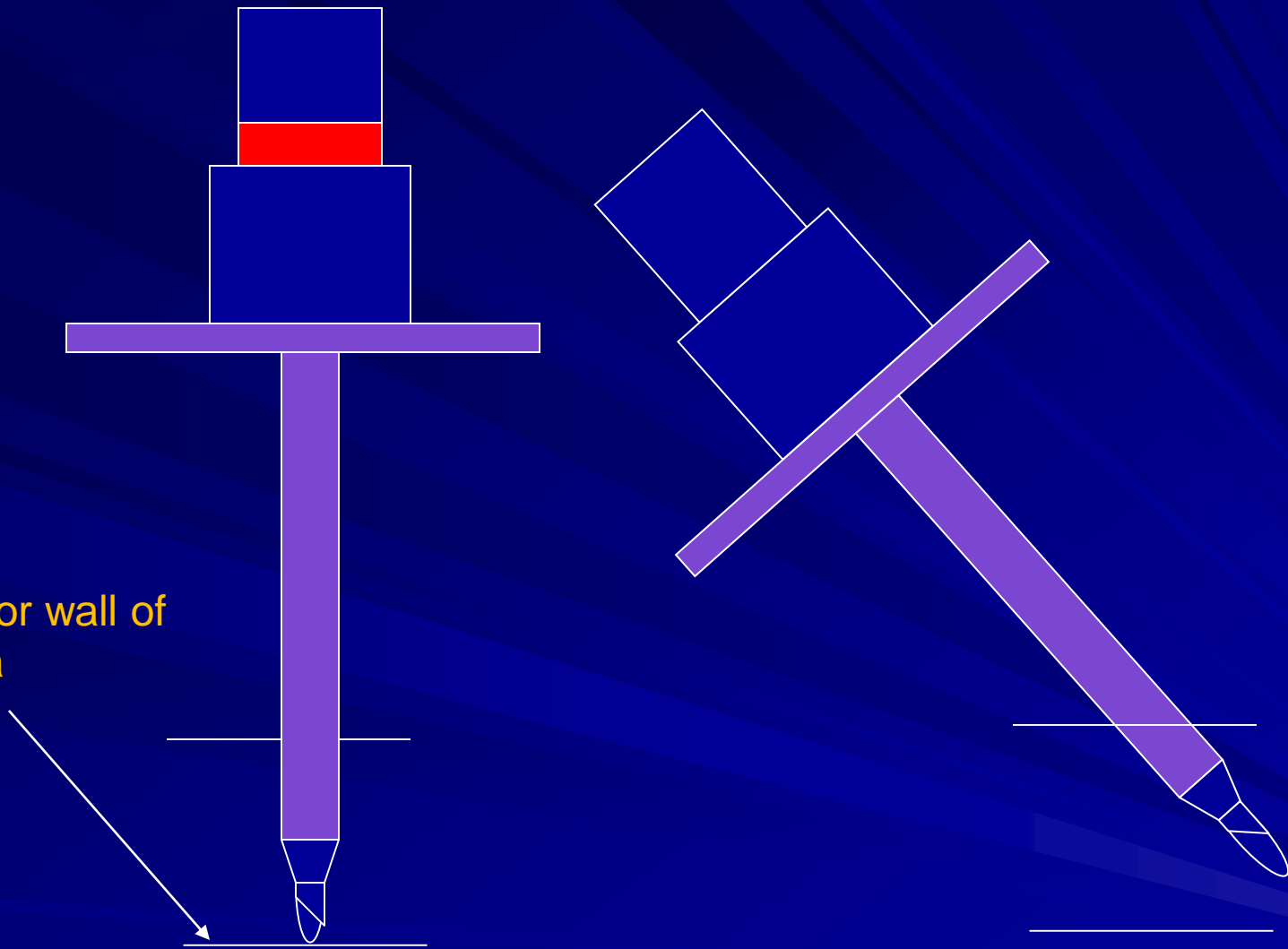


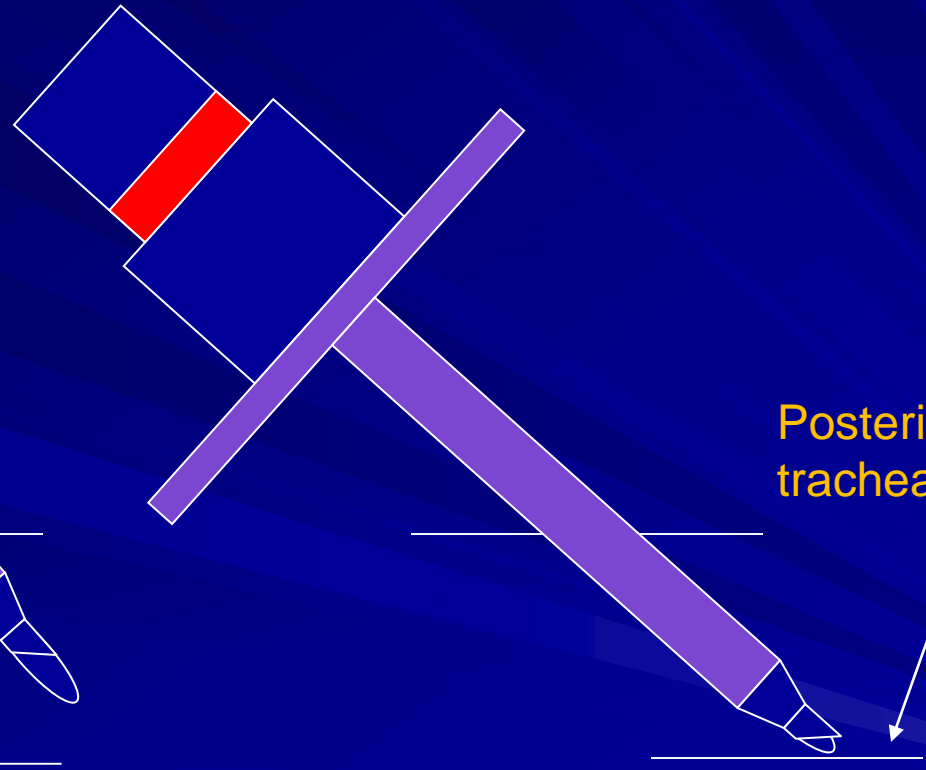
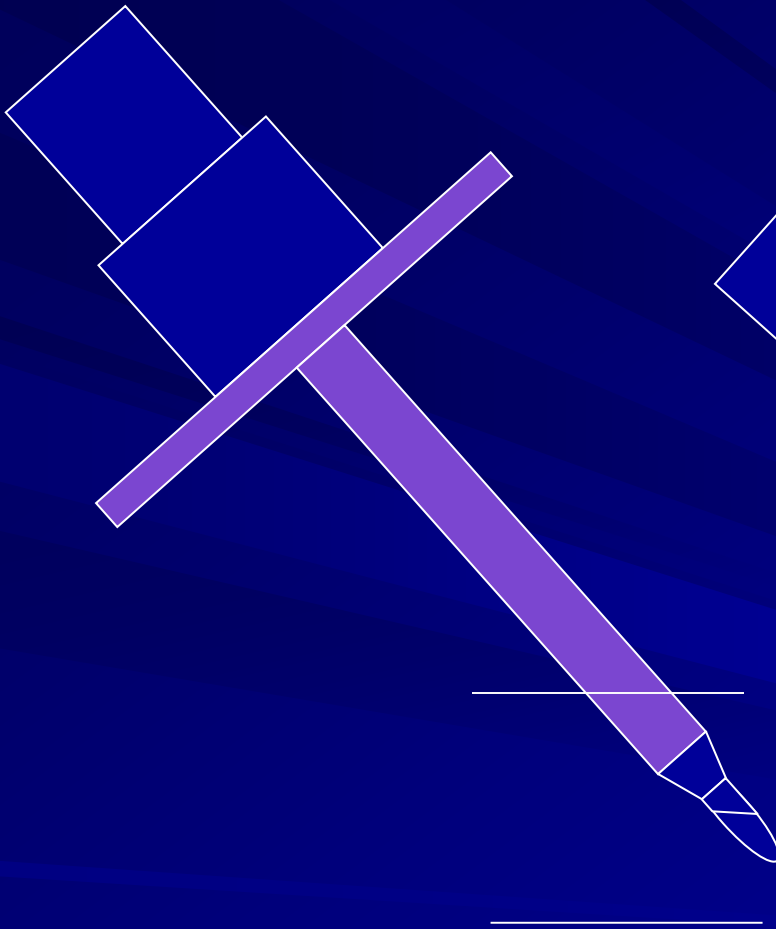
Conicothyroid
membrane

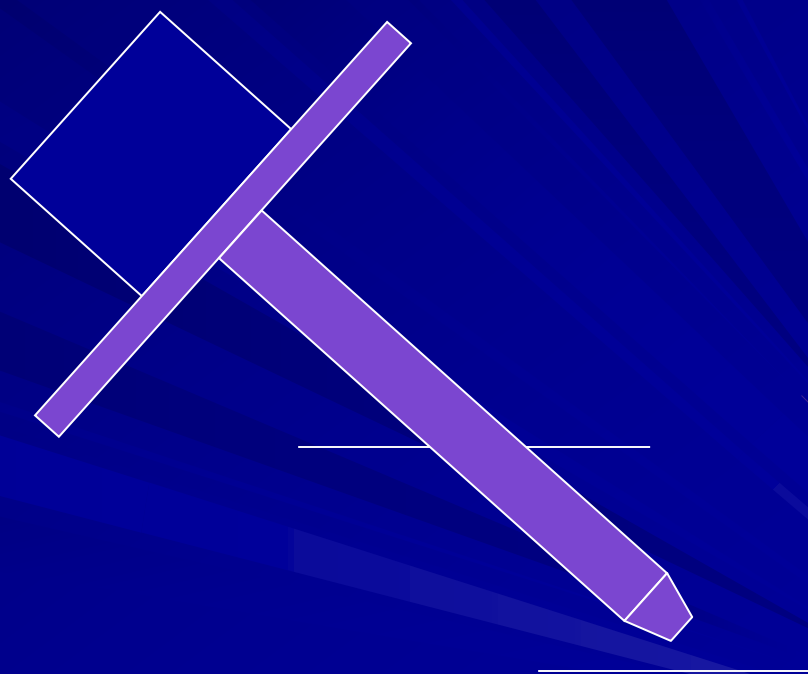
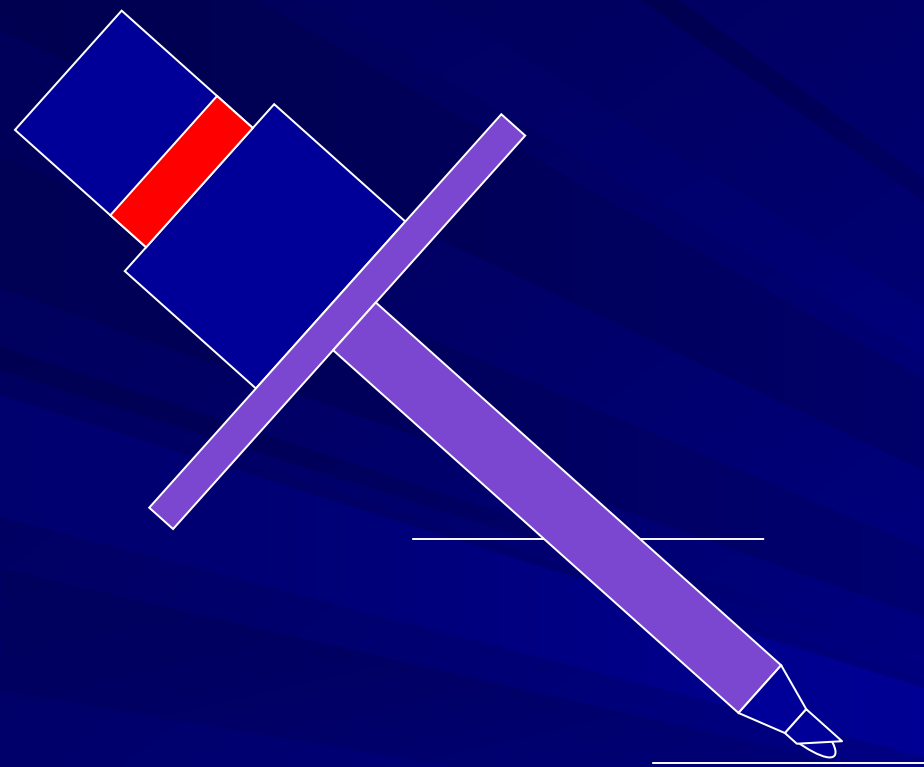




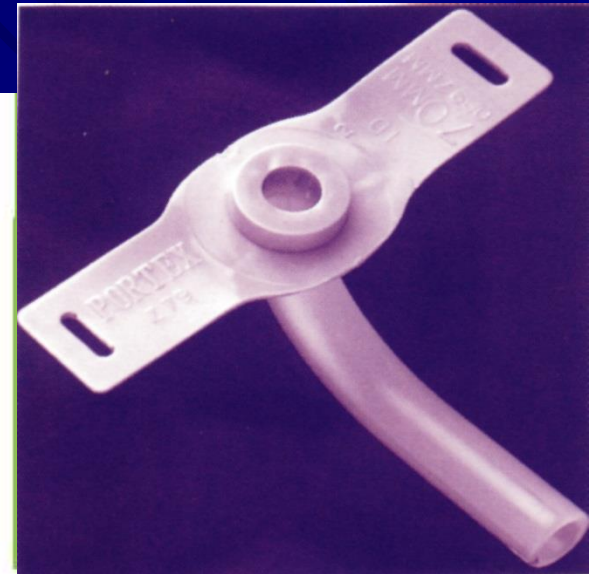
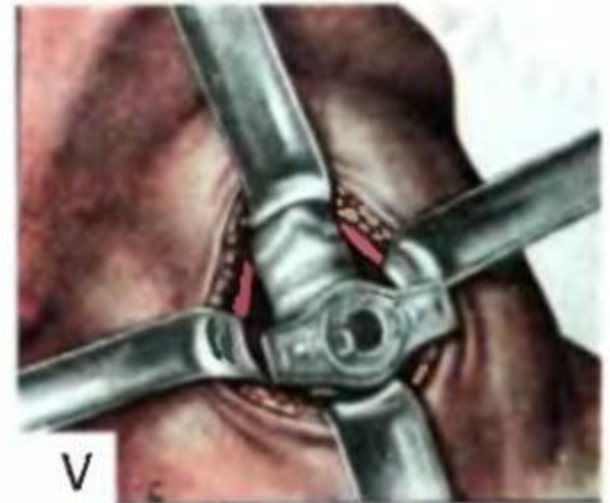
Posterior wall of trachea



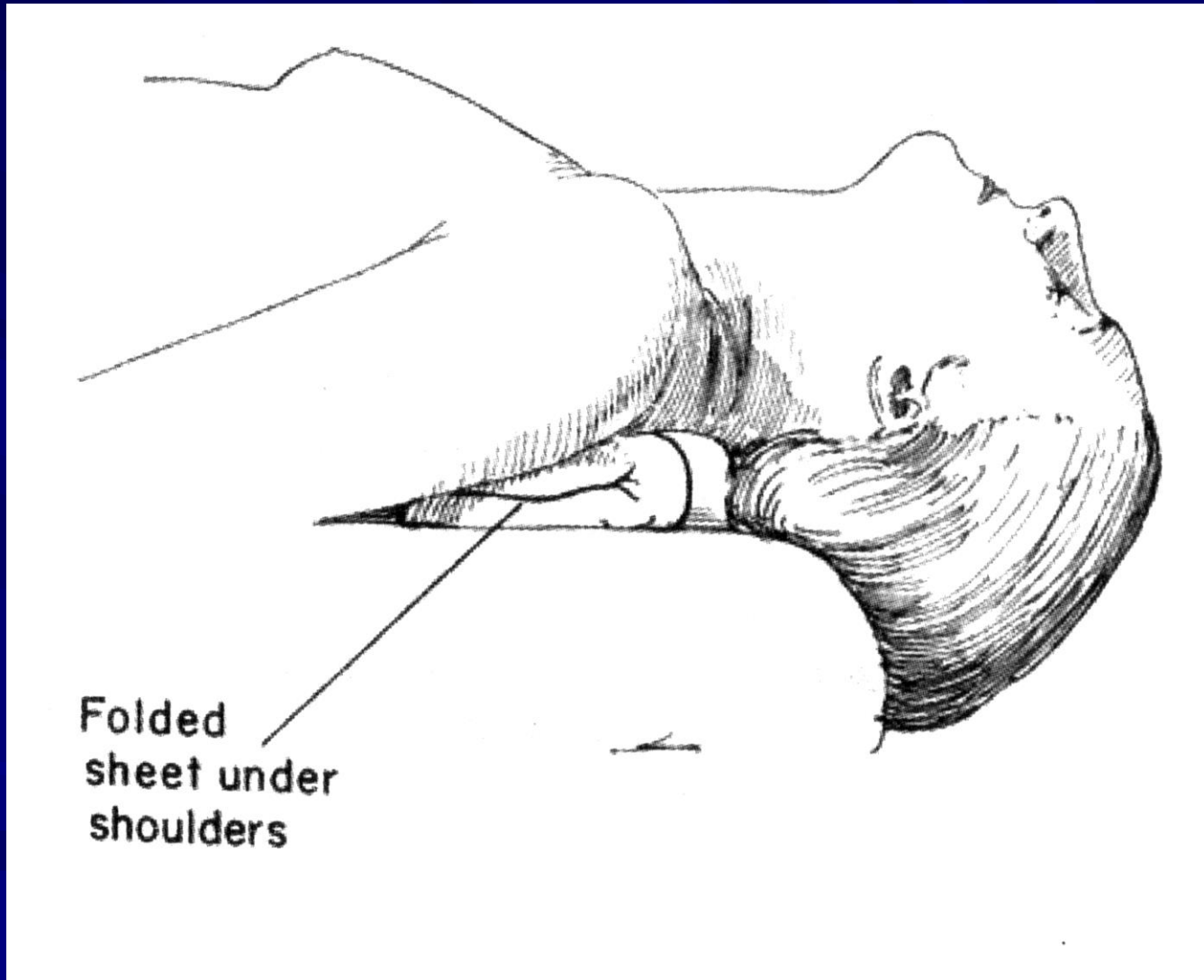




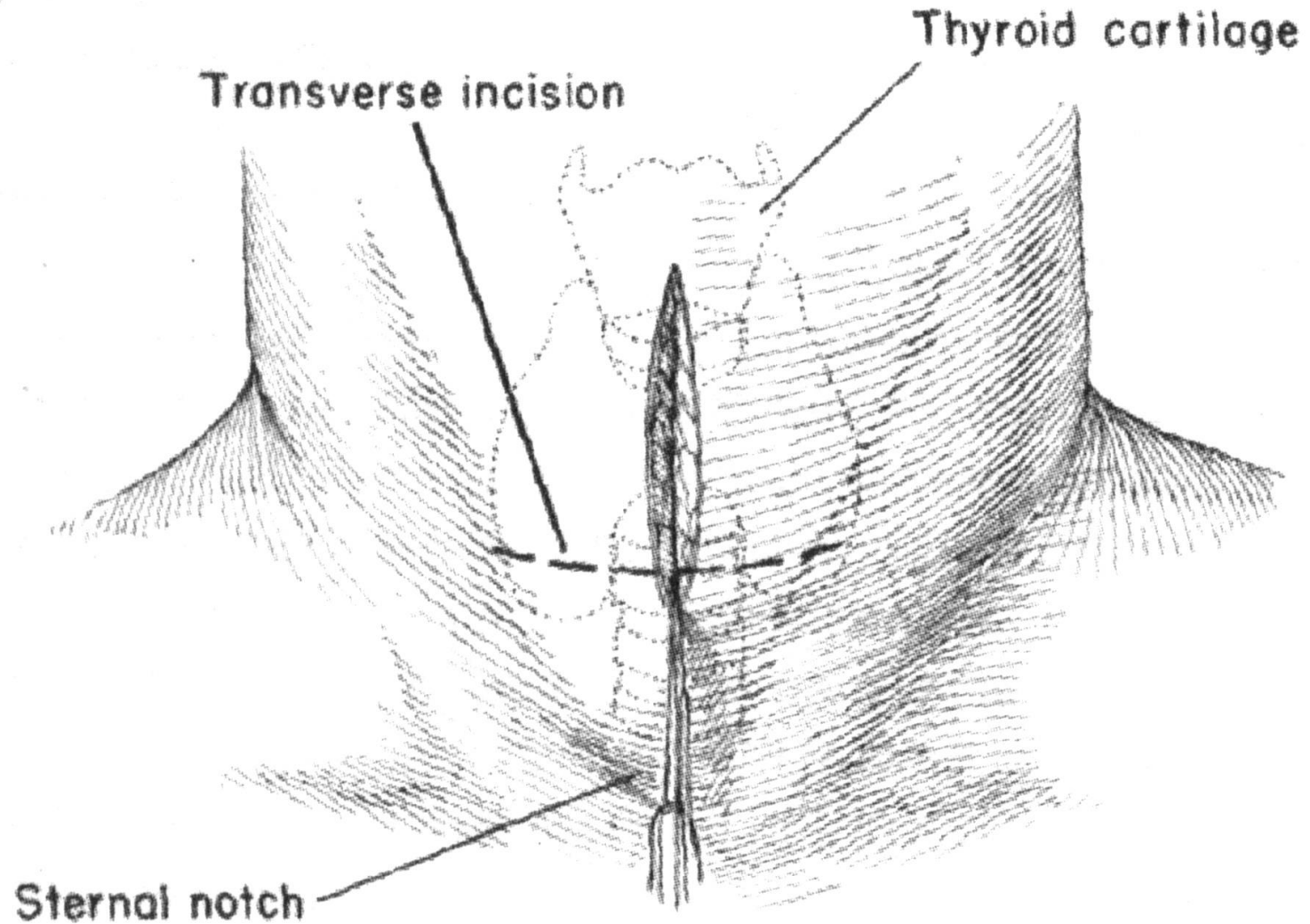
Tracheostomy



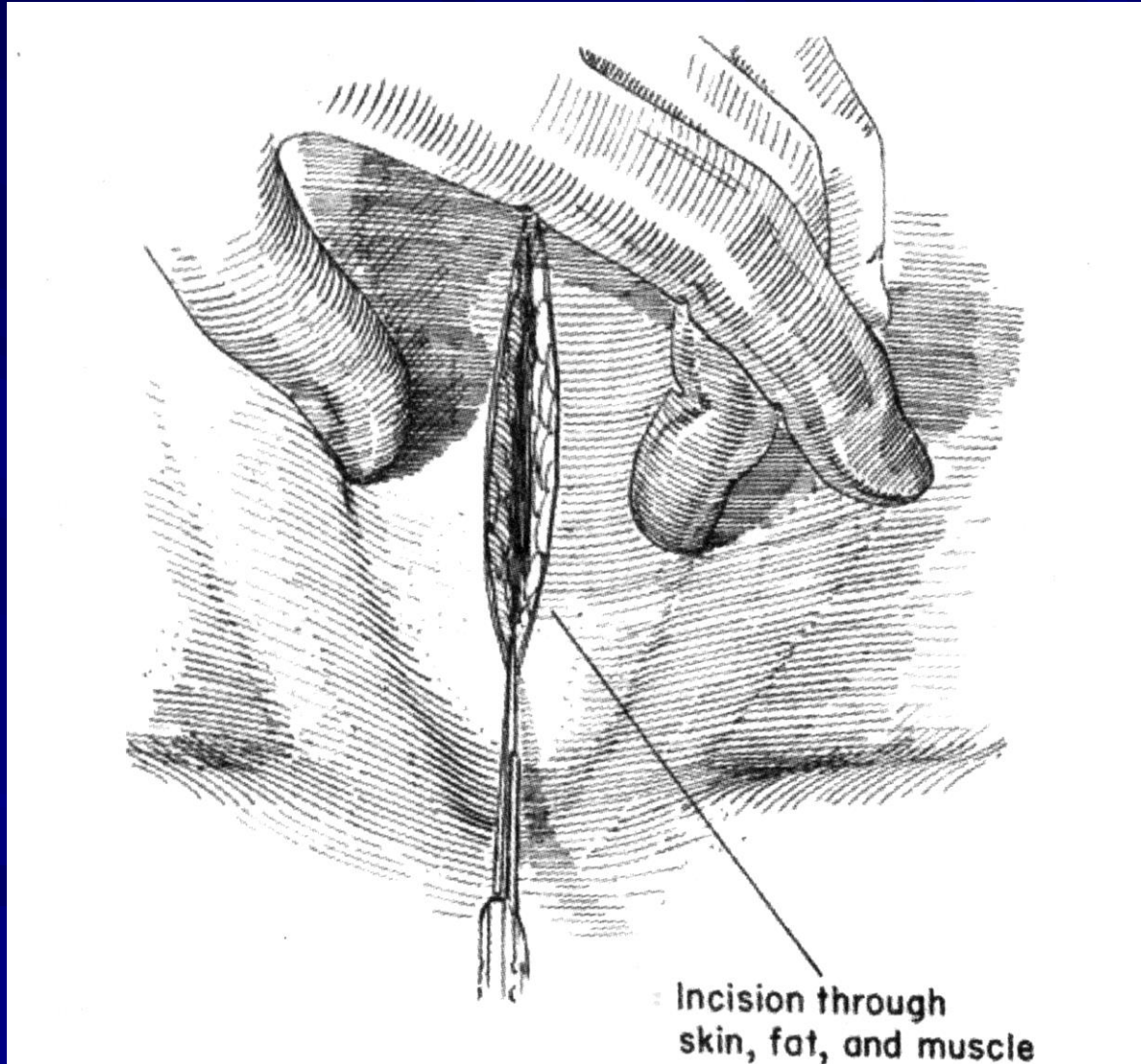
Tracheostomy: position



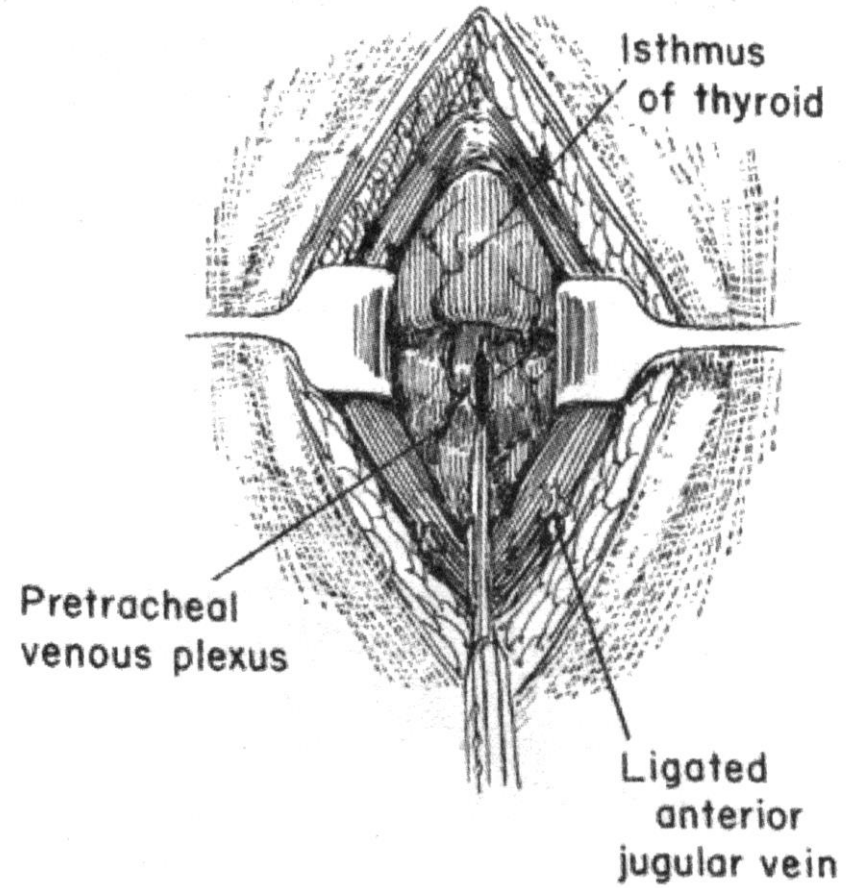
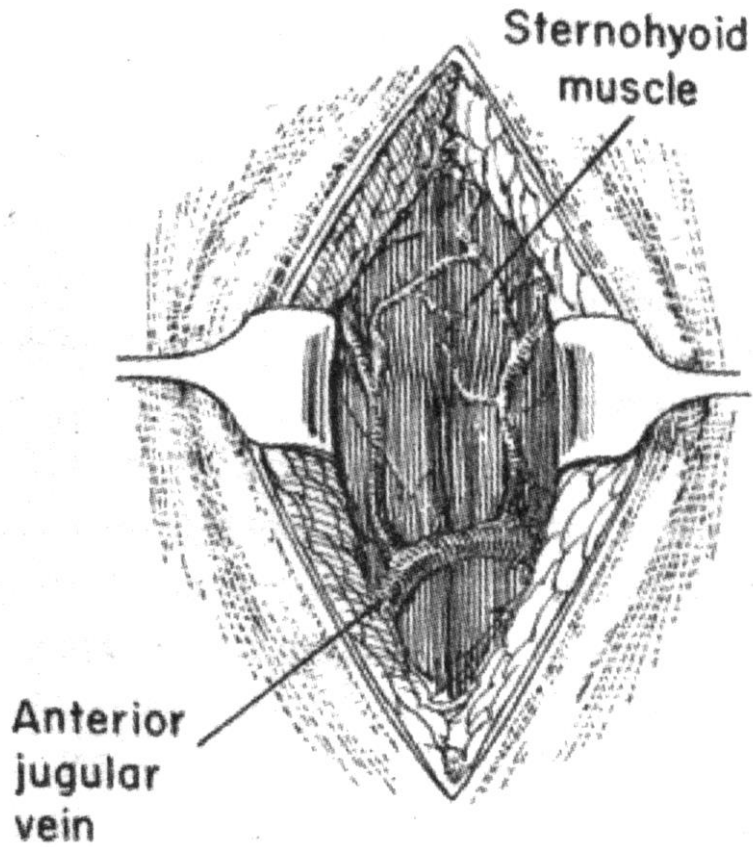
Tracheostomy



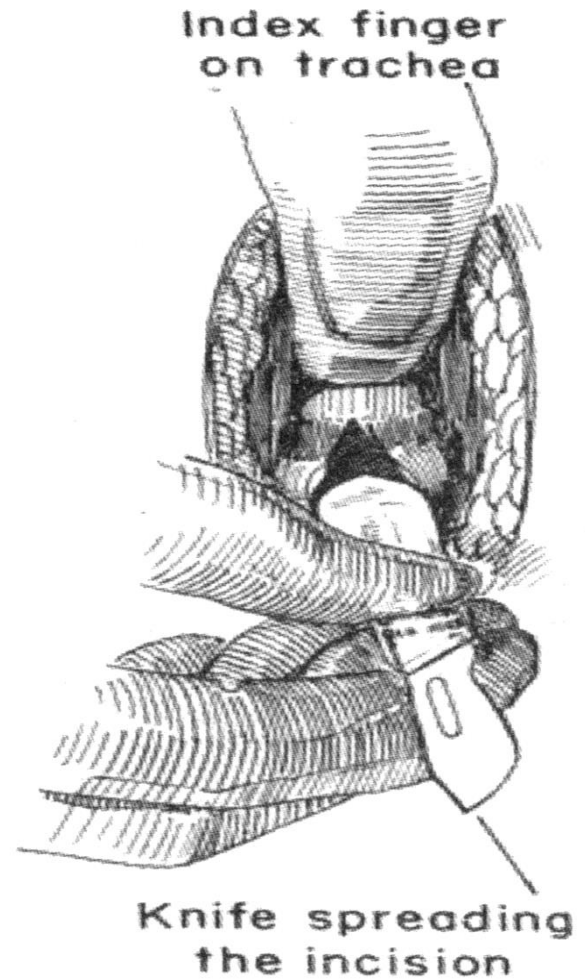
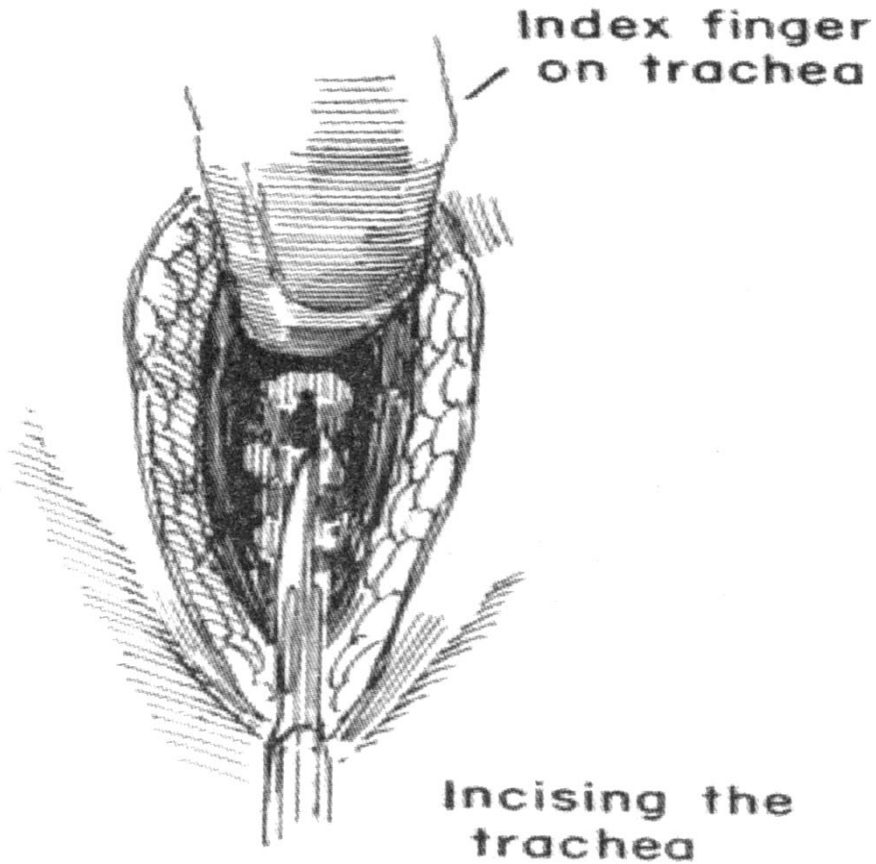
Tracheostomy



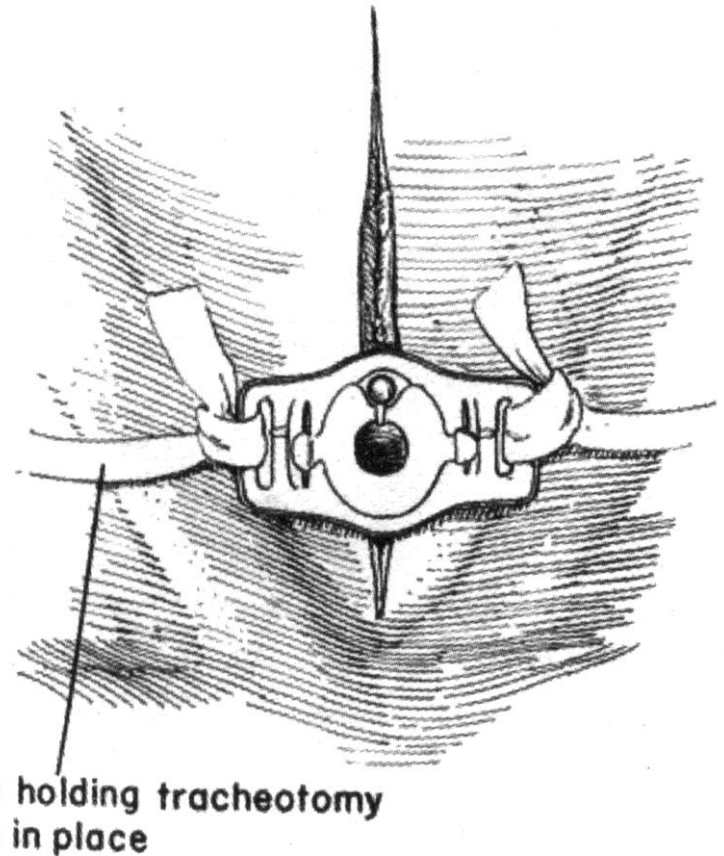
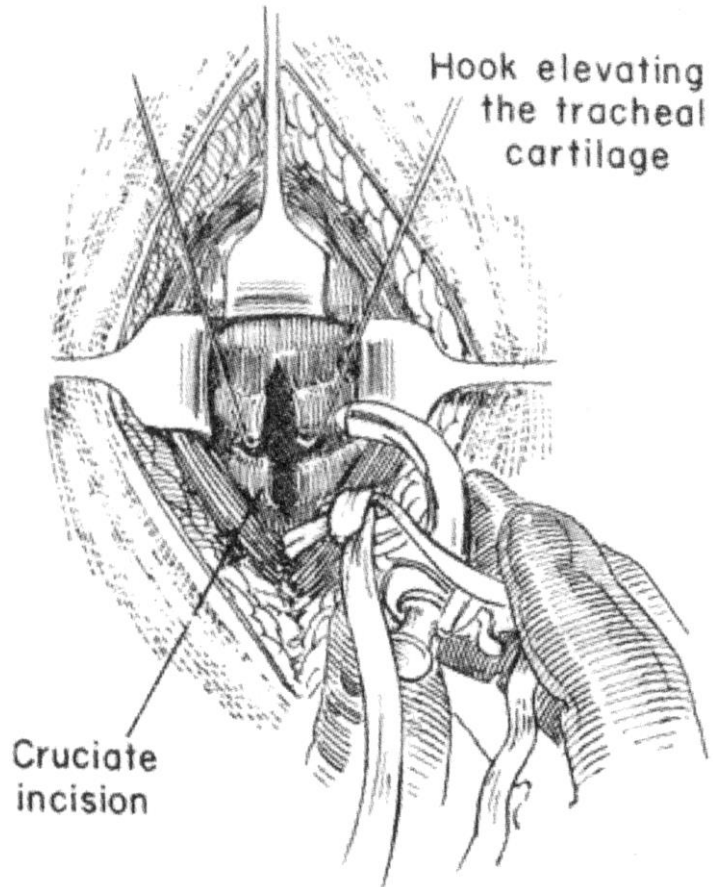
Tracheostomy



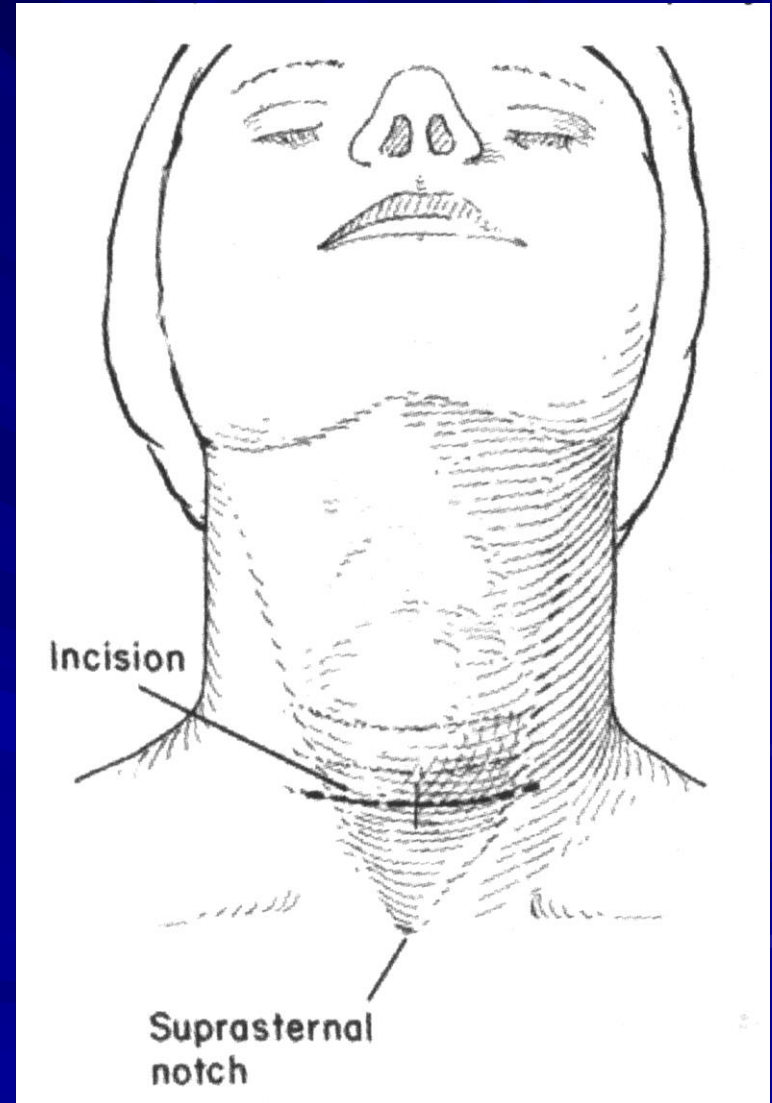
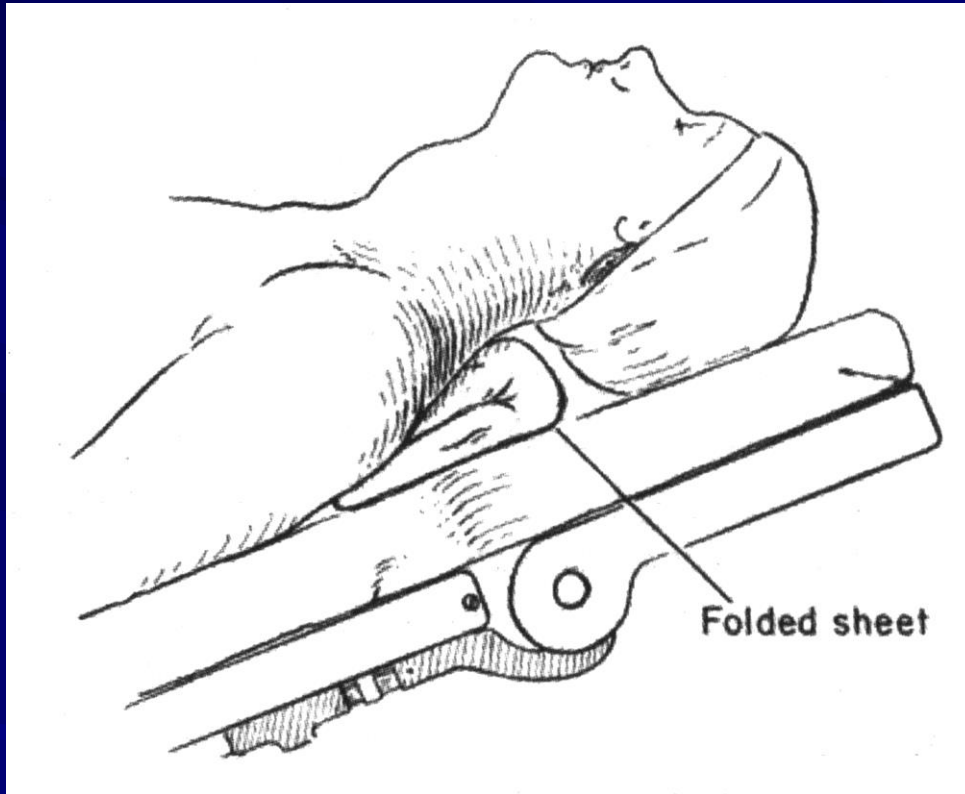
Tracheostomy



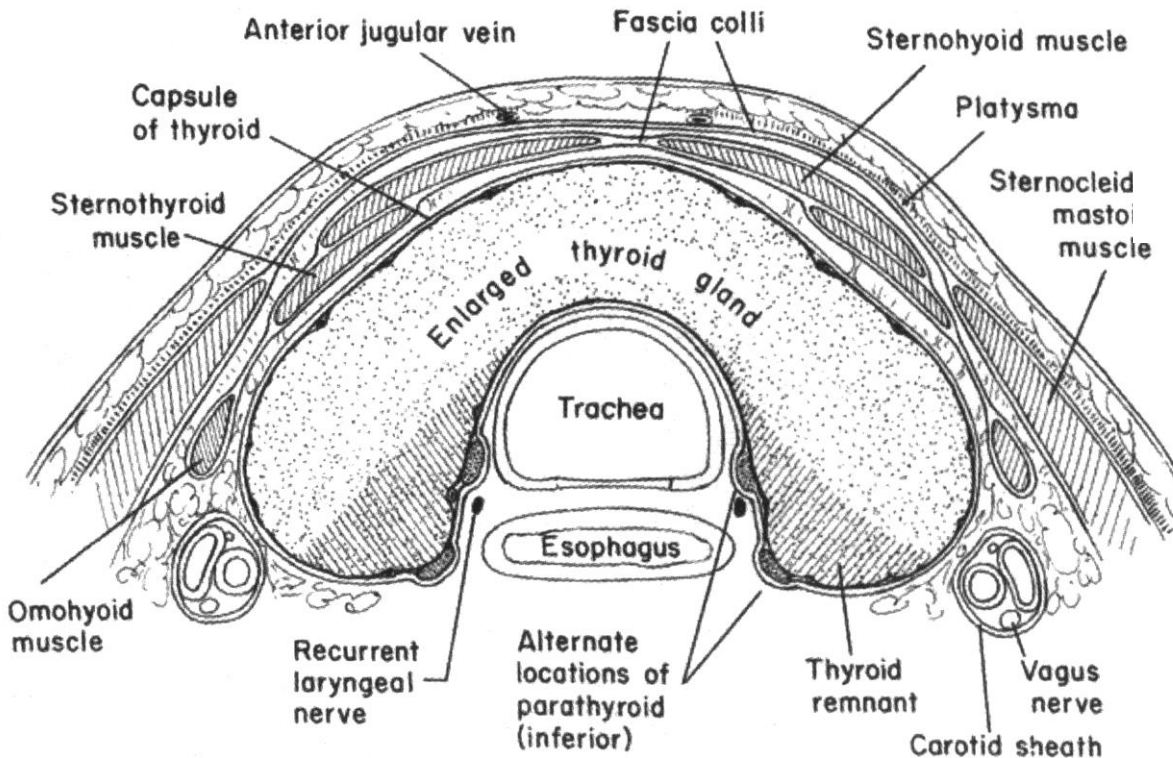
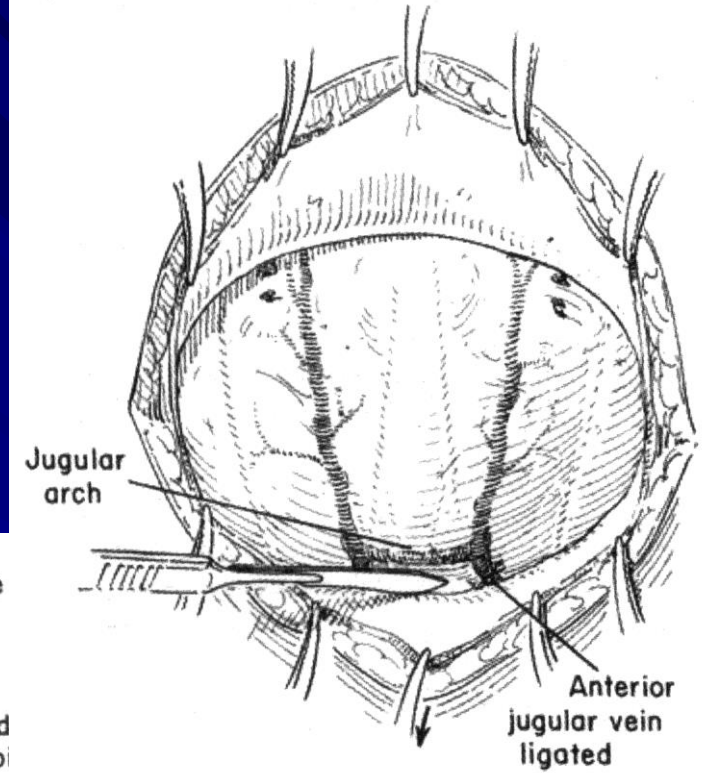
Tracheostomy



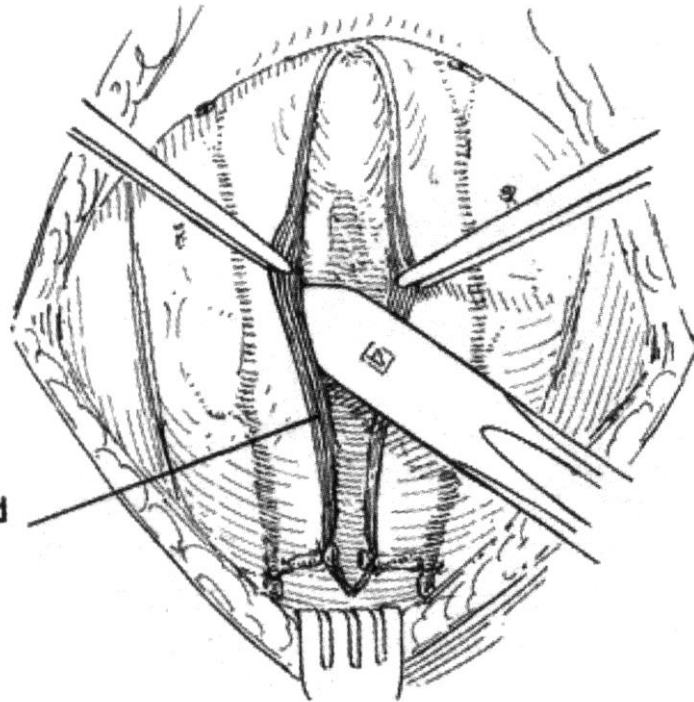
Thyroidectomy: position and approach



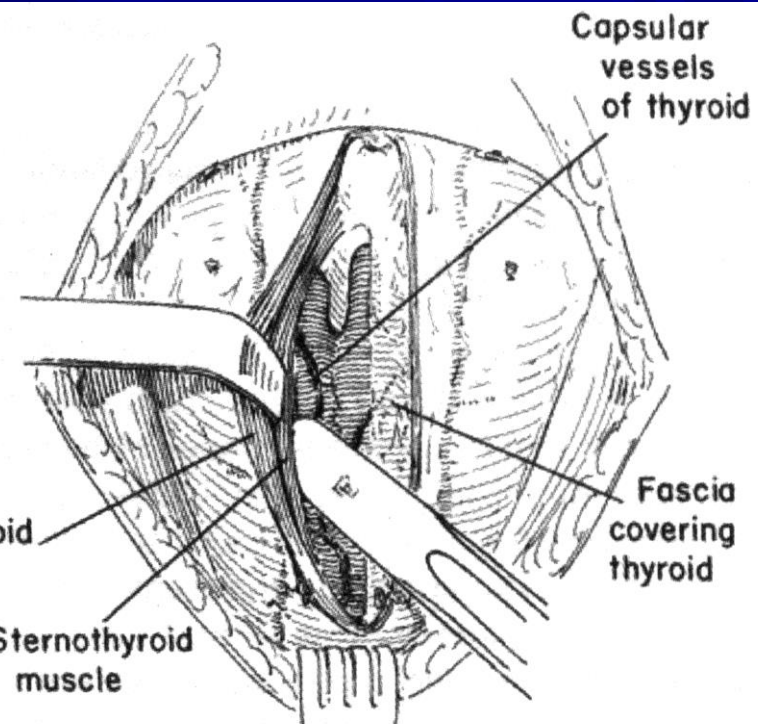
Thyroidectomy



Thyroidectomy



Sternohyoid muscle



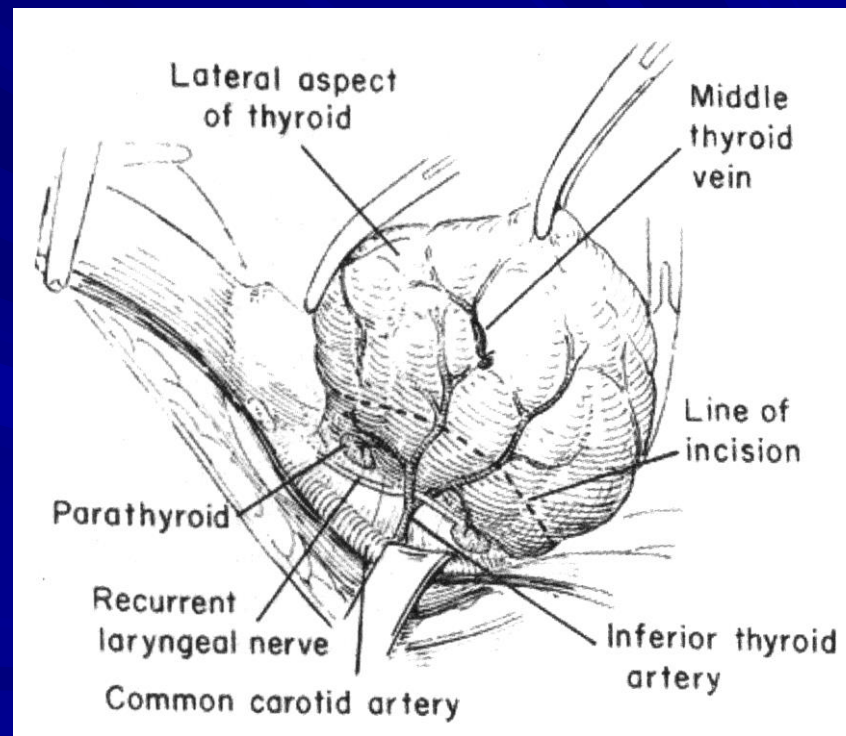
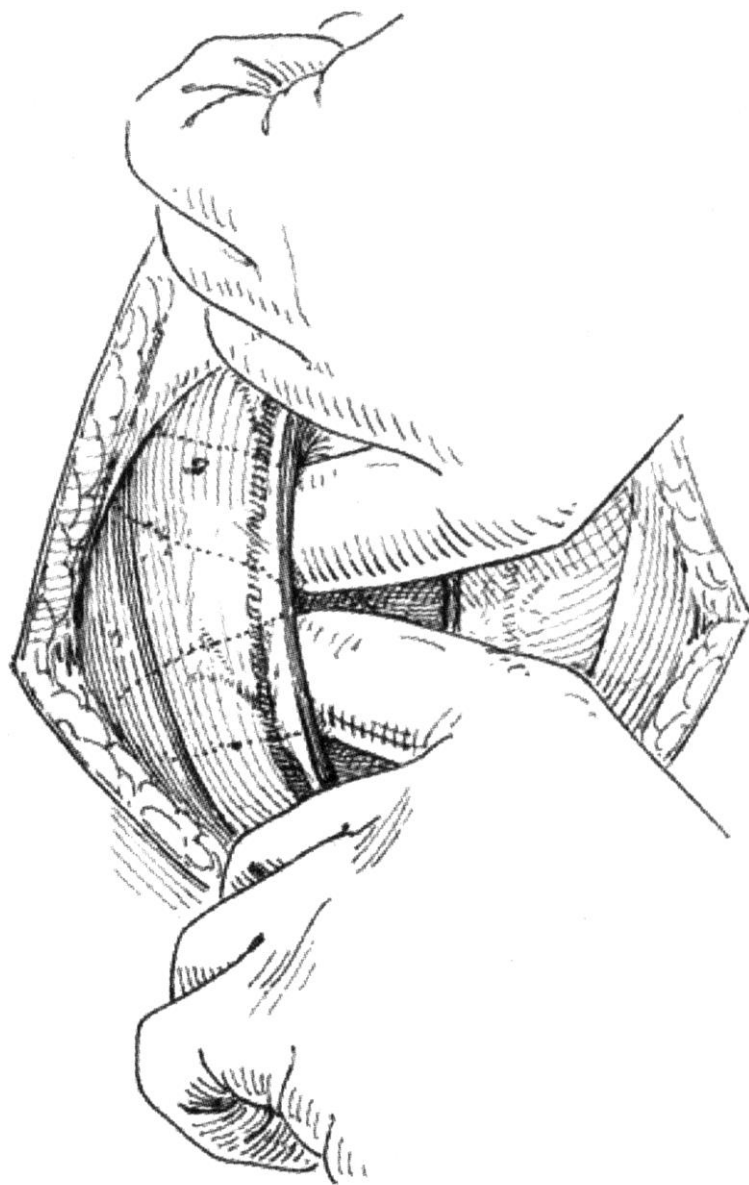
Capsular vessels of thyroid

Fascia covering thyroid

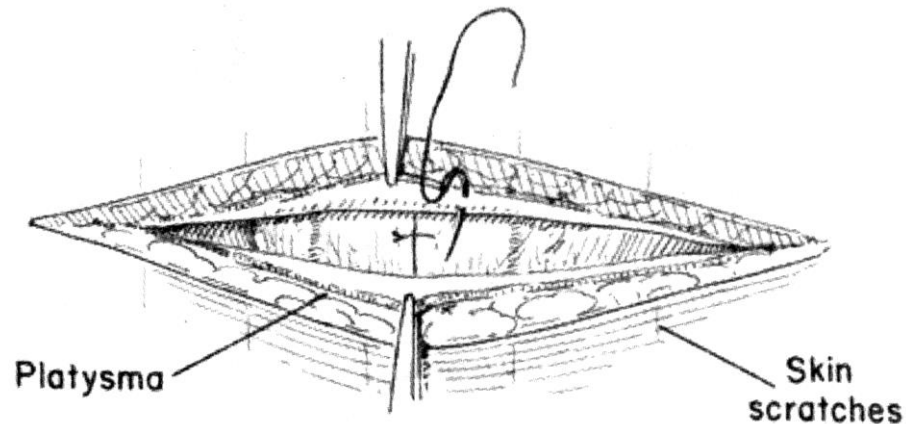
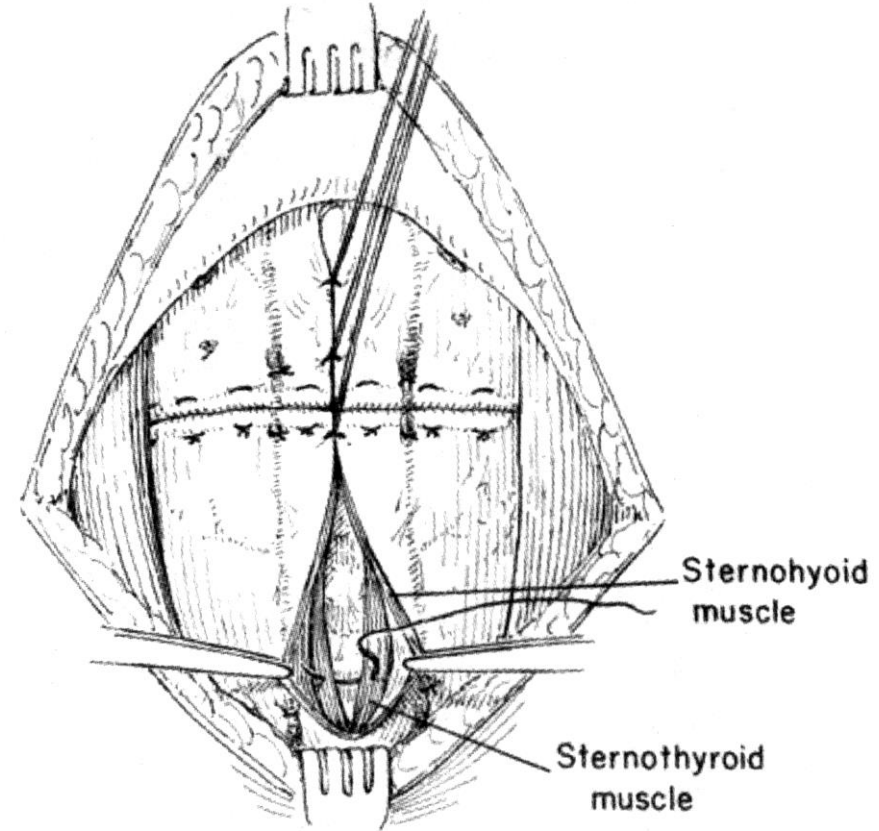
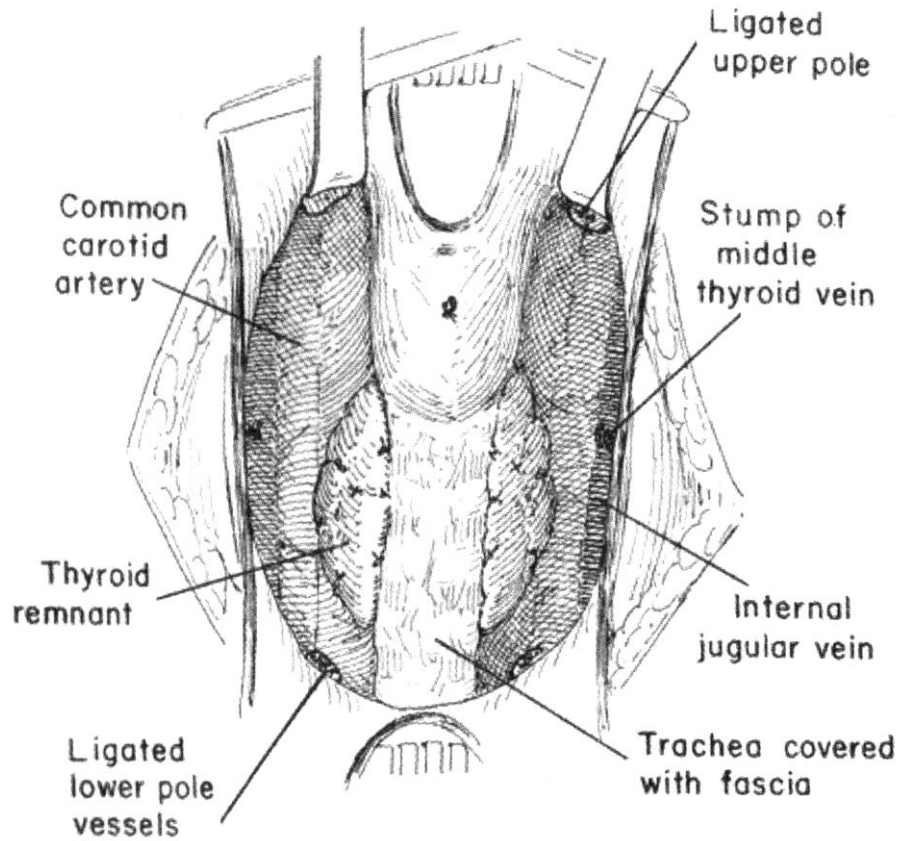
Sternohyoid muscle

Sternohyoid muscle

Thyroidectomy



Subtotal Thyroidectomy



Thank you for attention!

